

## EXHIBIT 2K

**IN THE UNITED STATES DISTRICT COURT  
FOR THE SOUTHERN DISTRICT OF WEST VIRGINIA  
CHARLESTON DIVISION**

<b>IN RE: ETHICON, INC. PELVIC REPAIR SYSTEM PRODUCTS LIABILITY LITIGATION</b>	<b>Master File No. 2:12-MD-02327 MDL No. 2327</b>
<b>THIS DOCUMENT RELATES TO PLAINTIFFS:</b>  <b>Diane Bellew (2:12-cv-22473)</b>	<b>JOSEPH R. GOODWIN U.S. DISTRICT JUDGE</b>

**RULE 26 EXPERT REPORT OF PROF. DR. MED. UWE KLINGE**

**I. BACKGROUND AND QUALIFICATIONS**

With regard to my medical training, I attended medical school in Aachen, Germany from 1977 to 1983. I began my medical profession at the surgical department of the University Hospital of the RWTH, Aachen, Germany (Department heads/Mentors: Prof. Reifferscheid - 1985, Schumpelick 1985-2010, Neumann 2010). From 1995 to 2006, my practice was focused primarily on abdominal surgery, and specifically, hernia repair. As a hernia surgeon, I used textile implants (flat meshes) for the repair of abdominal wall hernia or defects in more than 300 patients mainly groin hernia, umbilical hernia, incisional hernia and parastomal hernia. Although I never performed surgery for repair of SUI or POP, I implanted and studied the mesh used in TVT, Prolene, extensively.

In 1993, in addition to my surgical practice, I began focusing on surgical research in the area of biomaterial science including tissue engineering, material characteristics and designed preclinical models for surgical mesh and histopathology. I am the author/co-author of approximately 200 peer-reviewed publications listed in PubMed, over 100 of which involve hernia and/or surgical mesh. I have authored and/or contributed to more than 50 book chapters and have been an invited lecturer to more than 160 speaking engagements/conferences. I have received numerous research grants from various institutions and corporations including several grants from the German Ministry for Education and Research, the Ministry for Economics, the German research foundation DFG, the NRW Ministry for Education and Research, the Interdisciplinary Center for Clinical Research of the University (RWTH), as well as from industry (Ethicon, Covidien). (Attached hereto as Exhibit "A" is a current copy of my Curriculum Vitae with a list of my publications).

In 1994, we began looking at soft tissues and at the time, there was no information to help understand the cellular response to these materials. I then started to work with Dr. Bernd Klosterhalfen and together, we established a way to analysis soft tissue reactions in order to determine the difference between good materials and the best materials. This lead to the ability to see the extent of inflammation, foreign body reaction and fibrosis a biomaterial will have on the soft tissue and how that will directly relate to numerous complications. After the method was established, it was found in many of our publications and in the publications of our peers.

## **II. BRIEF HISTORY OF TEXTILE MESHES FOR TISSUE REPAIR 1958-1993 – THE ABDOMINAL WALL**

The current use of textile implants, so-called meshes, is based on Usher who, in 1958, started to publish the successful reinforcement of abdominal wall in six dogs. Initially, meshes were regarded an alternative procedure, particularly in big hernias. In 1986, Lichtenstein presented his procedure of mesh implantation as the new standard for groin hernia repair. With this technique, the mesh reinforces the tissue in a so-called “tension free” manner. In the early years, Usher used a knitted structure of polypropylene, later on widely known as Marlex®. However, Marlex® had increased stiffness after implantation along with considerable complications. Alternatives to Marlex were the polyester mesh Mersilene® or the ePTFE from Gore.

In the late 1980’s and early 1990’s, when polypropylene surgical mesh was starting to be used in hernia surgeries, there was a general lack of knowledge about the materials and about the clinical outcomes associated with these materials. Side effects often manifested with a considerable delay of up to several years. Correspondingly, reports dealing with pain as a major postoperative complication (less than 10% of all hernia publications in PubMed) were published with a delay of years [Fig.1]. We began to look at the scar formation pathologically and developed the theory that incisional hernias could be due to a biological problem.

2

## **III. DEVELOPMENT OF THE FIRST LARGE PORE MESH CONSTRUCTION THAT WAS ADAPTED TO PHYSIOLOGICAL REQUIREMENTS**

In the early 1990’s, we speculated that an adaptation of the strength of surgical meshes to the physiological requirements of the tissues in which they would be implanted may allow a considerable material reduction which could improve biocompatibility. We felt that the textile characterization of meshes at that time did not sufficiently reflect the physicochemical properties of the textile, so we had to start almost from the beginning to first identify the relevant parameters.

RWTH University initiated a research program such that in conjunction with various grants, we could add some basic investigations to this project. Through cooperative efforts with Ethicon and the support by these research grants, the project went on for about 10 years. In this period, we gained significant knowledge about the textiles; we defined standard biomechanical characterization for better comparison; we established models for testing the tissue response in animals; we looked for parameters that reflected the inflammatory and fibrotic activity of the foreign body reaction; we developed a technique to quantify the biomechanical impact on, and the biomechanical properties of, tissues.

As our research progressed, we calculated that hernia meshes needed a tensile strength of 16 N/cm and an elasticity of about 20-30% at this strain [Fig. 2]. Ethicon provided our research team with thin (about 40 µm) polypropylene threads. Because we were provided only with these 40-µm fibers, we had to combine 5 strands of them at interval distances of 2-3 mm to withstand a strain of 16 N/cm. As this polypropylene net was very floppy, we added an absorbable fiber of Vicryl® (Ethicon) to temporarily make it stiffer. After absorption of the Vicryl®, there would remain just an open structure, with about 30% of the material of the Marlex®. This new structure with pores larger than 2 mm, later marketed as Vypro® by Ethicon (1998), was then studied extensively in several experimental studies. The results were presented at several conferences and most of it has been published in PubMed-listed journals.

In the 1990's, the mesh proponents were convinced that the problem of recurrence had been solved, that the outcome was not affected by the type of material used and that mesh-related complications were essentially nonexistent but occurred mainly as a result of surgical technique or patient co-morbidities. However, our extensive surgical mesh research over twenty-years, including our research, with Ethicon, demonstrates that these opinions are incorrect.

#### IV. BIOMECHANICS

The main task of biomaterials used for surgical repair is to strengthen the tissue in which it is implanted and to restore its function. Specific to pelvic organ prolapse, the primary task of the prosthetic is to strengthen the pelvic floor tissues and to restore the pelvic anatomy and function. The mesh should mimic as closely as possible, and be integrated physiologically into, the tissues of the pelvic floor based on a maximum biocompatibility. Such surgical biomaterials should be without serious long-term complications such as recurrence, erosion, infection or chronic pain, and should have optimal handling characteristics for an easy, comfortable and safe repairs.

Ethicon's professional education team communicated what it considered to be the "ideal" mesh requirements for pelvic floor repair to physicians that were being trained by Ethicon in the Prolift technique. They stated to physicians that the "ideal" vaginal graft should "be histologically well tolerated (inert), resist infection, be easily handled and implanted, incorporate into surrounding tissues, resist mechanical stretch, not shrink, and recreate and maintain the physical characteristics of the supple and distensible vaginal wall."<sup>1 2</sup>

Ethicon aware of the difficulties in defining the biomechanical requirements of the human pelvis. They admit in their internal documents regarding the biomechanical requirements of the pelvis that although "...the ideal mesh for prolapse repair which mimics precisely the biomechanical needs of the pelvic floor region has not been developed."

Ethicon recognizes that:

"...a recent major focus of mesh development and research is the patient's quality of life. Pain and discomfort can result from stiff mesh that were

<sup>1</sup> ETH.MESH.00033325: Professional Education PowerPoint presentation titled "The Science of Augmented Extracorporeal Reconstructive Pelvic Surgery" in which the "Ideal Mesh" is described

<sup>2</sup> ETH.MESH.03906525 Graft or No Graft PowerPoint Presentation

originally designed for hernia surgery and ‘over-engineered’ to exceed the burst strength of the abdominal wall at the cost of losing compliance. Although limited data suggests that, in terms of anatomical and biomechanical outcomes, synthetic polypropylene meshes are superior to biologic meshes, there is significant evidence that the complications associated with synthetic meshes can cause significant morbidity including infection, erosion, exposure, and pain. In addition, the vaginal tissue to be augmented is often structurally compromised, atrophic, and devascularized. Such poor tissue quality increased the risk of poor tissue incorporation into the mesh potentially resulting in suboptimal healing and mesh exposure or erosion into an adjacent viscous. Moreover, there is evidence that meshes shrink in vivo leading to increased stiffness, pain and poor restoration of the normal properties of the vagina compliance. Research has demonstrated that bioprosthetic mesh implantation results in a scarring reaction and subsequent decreased compliance. An ideal quality of prosthetic mesh would be to mimic the compliance of the supported tissue thereby resulting in more comfort and function after implantation. To be able to define the most appropriate design parameters for the next generation of pelvic floor prosthesis it is important to generate an advanced understanding of the pelvic floor biomechanics and associated mechanical boundary conditions.”<sup>3</sup>

Ethicon scientists recognized that the unique requirements in pelvic reconstructive surgery include the fact that 1) anatomically, the pelvis has a complex, 3-dimensional architecture and vector forces with little or no bony (and often pelvic floor muscle) reinforcement, and 2) functionally, the prosthetic must remain pliable as a result of pelvic organ filling/emptying, tissue pliability, and sexual function.<sup>4</sup> These and other Ethicon scientists also admitted that there is no descriptive model available to predict the mechanical behavior of pelvic mesh implants. Furthermore, Ethicon’s Medical Affairs Director, Axel Arnaud, testified that Ethicon’s claim that their pelvic floor meshes remain soft, supple and/or pliable was “an illusion”.<sup>5</sup>

Other employees at Ethicon, namely, those involved in regulatory and sales and marketing, told a different story. In the Prolene Soft 510(k), the Gynemesh PS 510(k), as well as in the Gynecare Prolift IFU, Ethicon claims that “the elastic properties of the mesh adapt to the various stresses encountered in the body.” Ethicon admitted to the FDA in 2007 that they had no data to support this statement.<sup>6</sup> In its patient brochures for Prolift, Ethicon claims that the Prolift repair system is “a revolutionary surgical technique... [that] uses a soft synthetic mesh specially designed for placement through the vagina...”<sup>7</sup> However, the term “specifically designed” came to the attention of Mark Yale, WW Director of Risk Management during the development of the

<sup>3</sup> ETH.MESH.02010834-ETH.MESH.02010854: February 16, 2011 report written by Jurgen Trzewik and Christophe Vailhe titled “Biomechanical consideration for Pelvic floor mesh design”

<sup>4</sup> ETH.MESH.00033325: Professional Education PowerPoint presentation titled “The Science of Augmented Extracorporeal Reconstructive Pelvic Surgery” in which the “Ideal Mesh” is described

<sup>5</sup> Axel Arnaud Deposition November 15, 2013 68:10-69:13

<sup>6</sup> ETH-65881: Gynecare Prolift IFU

<sup>7</sup> ETH-00255: Ethicon Gynemesh PS 2006 marketing brochure

Prolift +M IFU. He stated that “this mesh was not ‘specifically designed’ for Prolift application, we pulled a mesh out of our existing bag of tricks.”<sup>8</sup>

Dr. David Robinson, Medical Affairs Director at Ethicon, gave a Power Point presentation titled “Review of Surgical Techniques Using Mesh”<sup>9</sup> which was marked as Plaintiffs’ Exhibit 519 of his deposition. The presentation states: “material science has been slow to meet the special requirements of the vaginal environment” and “The vagina is **NOT** the abdomen and it is not similar to any other surgical environment.” When this portion of his presentation was discussed at deposition.<sup>10</sup> Dr. Robinson agreed that these are accurate statements.

### **Physiologic properties of pelvic tissue**

The primary difficulty in developing a model to predict the mechanical behavior of pelvic mesh implants lies in the understudied and poorly understood characteristics of vaginal tissue. Drawing conclusions from studies involving animal tissues in an attempt to correlate those findings to the tissues in the human pelvis has severe limitations. As Ethicon has recognized, “[a]nimal models allow for controlled studies, which are useful in understanding the underlying factors that may contribute to the development and progression of human diseases by systematically examining confounding risk factors. However, the need to translate findings to the clinic is very important, and therefore understanding how these animal models relate to humans must be evaluated.”<sup>11</sup> In fact, in the 2010 Preclinical Efficacy Assessment for Ethicon Gynecare Gynemesh M, it says, “There is no representative quadruped animal model of human vaginal prolapse.” It then goes on to say that the most similar pelvic anatomy would be that of a baboon, but, “this species has not demonstrated the pathology of spontaneous pelvic organ prolapse”<sup>12</sup>

5

At the conclusion of our work in the development of Vypro hernia mesh with Ethicon, my colleagues and I published an animal study in which we demonstrated that the physiological forces of the abdominal wall could be quantified.<sup>13</sup> By properly defining these physiological forces for the first time, we were able to demonstrate how the animal model related to human in vivo behavior to improve the textile structure of hernia meshes, and thus, to improve the symmetrical distribution of the retaining forces in all directions. Compared with the considerable restriction of the abdominal wall mobility by Prolene (polypropylene) and Mersilene (polyester) meshes, there was no increase in the bending stiffness after the implantation of the new mesh in rodents. Histological examination showed a pronounced reduction of the inflammatory reaction in the tissues, and the collagen bundles were orientated merely around the mesh filaments instead of forming a scar plate that completely embedded the

<sup>8</sup> ETH.MESH.00318775: Email dtd 5/08/08 from Mark Yale to Jennifer Paine, Jonathan Meek et al regarding Prolift mesh was “not specifically design”.

<sup>9</sup> ETH.MESH.00396836: PowerPoint presentation created by David Robinson titled “Review of Surgical Techniques using Mesh”

<sup>10</sup> David Robinson Deposition Testimony from rough draft 293:13; 194:14

<sup>11</sup> ETH.MESH.02010834-ETH.MESH.02010854: February 16, 2011 report written by Jurgen Trzewik and Christophe Vailhe titled “Biomechanical consideration for Pelvic floor mesh design”

<sup>12</sup> ETH.MESH.04940233 – Preclinical Efficacy Assessment for ETHICON GYNECARE GYNEMESH M

<sup>13</sup> U. Klinge, et al., Modified Mesh for Hernia Repair that is Adapted to the Physiology of the Abdominal Wall; Eur J Surg 1998; 164: 951-960

mesh. By adapting the design of the new hernia mesh to the physiological forces of the abdominal wall, we were able to reduce the amount of prosthetic material which caused less inflammation and less restriction in the mobility of the abdominal wall while retaining the required tensile strength of 16 N/cm.

No similar, definitive studies have been conducted by Ethicon for the pelvic floor. Pelvic tissue is extremely complex; it has a non-linear stress-strain relationship, large deformation before yield, is viscoelastic, inhomogeneous, anisotropic and, when trying to analyze the tissues upon explant, has changing vaginal tissue properties after removal from the body.<sup>14</sup> There have been a number of scientists and surgeons, Cosson, Rubod, Boukerrou, and Boulanger, just to mention a few, who have attempted through various studies to characterize the biomechanical behavior of human vaginal tissue. However, as is evidenced by their studies and acknowledged by Ethicon, “the reported vaginal tissue properties vary extremely for different investigators and different experimental setups; there is no consistent nomenclature for biomechanical properties established; and, the reported material parameters exhibit a strong deviation even between different patients, examined by the same investigators...more data is needed from humans to help us characterize the differences between normal and pathological tissues, as well as to help us identify appropriate animal models.”<sup>15,16</sup>

Ethicon R&D engineer, Christoph Vailhe testified that newer manuscripts contain more reliable and definitive data regarding vaginal tissue properties including elasticity. However, a review of those manuscripts indicates that they actually continue to demonstrate ongoing debate and a lack of reliable and sufficient data concerning vaginal tissue properties.<sup>17 18 19</sup>

6

Christoph Vailhe further testified that “As of 2012, no validated animal model exists to evaluate mesh erosion in the pelvic floor or to determine the biomechanical forces of the pelvis”.<sup>20</sup>

Apparently Ethicon merely converted our work on new generation hernia meshes and repackaged it as pelvic meshes assuming, without justification, that a safe mesh design for hernia application equaled a safe mesh design for pelvic floor application. As injuries to numerous patients continue to mount, this assumption has proven dangerously faulty.

For example, from October through December 2008, prior to Ethicon’s launch of its new generation POP mesh, Prolift +M, there were required readings by the sales and marketing force to educate them regarding certain aspects of pelvic floor meshes before detailing the product with surgeons. These were known as “Prolift +M Pre-readings”. Jonathan Meek, the Prolift +M

<sup>14</sup> ETH.MESH.03753245: PowerPoint presentation titled “Biomechanics (Pelvic Forces)”

<sup>15</sup> ETH.MESH.02010834-ETH.MESH.02010854: February 16, 2011 report written by Jurgen Trzewik and Christophe Vailhe titled “Biomechanical consideration for Pelvic floor mesh design

<sup>16</sup> ETH.MESH.03753245: PowerPoint presentation titled “Biomechanics (Pelvic Forces)”

<sup>17</sup> Christoph Vailhe Deposition June 20, 2013 45:23-46:11

<sup>18</sup> ETH.MESH.04005863: Yves Ozog, Theoretical and Experimental Evaluation of Implant Materials used in Pelvic Organ Prolapse Repair (Doctoral thesis in Medical Sciences 2001)

<sup>19</sup> ETH.MESH.07191144: Stepan Janda, Biomechanics of the pelvic floor musculature (Thesis)

<sup>20</sup> Vailhe deposition 06/21/2013 251:11 to 252:15



team member in charge of sales and marketing, included in these readings the work that my colleagues and I had done ten years prior (reference above).

This leads me to a number of important observations: 1) Ethicon had not conducted their own studies on pelvic mesh that would have built upon the knowledge they had gained a decade prior in order to determine whether their pelvic floor meshes approximated the physiological forces in the pelvis; 2) four of the seven suggested articles were studies involving hernia meshes from the late 1990's and only two of the remaining studies involved vaginal tissue; and 3) Mr. Meek admitted in an email dated October 29, 2008 that "...up until recently, I was ignorant to the work carried out by the likes of Cobb, Klosterhalfen and Klinge to name a few as it was assumed that they [were] primarily researching Inguinal Hernia repair and it didn't translate to Pelvic Floor. As it turns out, the vast majority of their work is pre-clinical which mirrors the more recent work done by Cosson, Boulanger, Rubod et al. done for the Pelvis."<sup>21</sup>

Mr. Meek's statement is actually only partly true. Yes, our work was to a large extent "pre-clinical" in order to better understand certain design parameters of hernia meshes. However, unfortunately, our work was not continued by Ethicon in its development of pelvic meshes in that they failed to define the physiological forces in the pelvis and thus to translate this to design consideration for pelvic meshes. The work by Cosson et al. is preliminary in this regard. As Ethicon's own documents point out, there are still many unknowns regarding how best to design pelvic floor meshes in light of the still undefined physiologic requirements of pelvic floor and in particular, vaginal tissues. As Mr. Meek points out later in his email, these studies from the late 1990's have a few key points. Two of these that he communicates to the sales force are that "PP is the best of a bad lot re integration and retraction and there is a need to develop grafts that mimic the human tissue mechanical properties... [and] the need for grafts with elastic properties to match [the hyperelastic properties of the vagina]."

Unfortunately, Mr. Meek was not the only Ethicon employee who was misguided in this analysis. In May 2007, while the Prolift +M team was recommending updates to the IFU, they also attempted to use our 1998 rat study to support claims in their IFU for Prolift +M. It was disingenuous, at best, and closer to misleading for Ethicon to use a ten-year-old hernia mesh study from the abdominal wall of rats to validate their claim that Prolift +M would "illicit a minimum to mild inflammatory reaction" and "thus incorporate the mesh into adjacent tissue."<sup>4</sup>

They also used our study from 1998 to claim that "the bi-directional elastic property allows adaptation to various stresses encountered in the body." First of all, the mesh we used in our study was Vypro, which was a multifilament PP mesh designed for the abdominal wall. Additionally, Vypro's PP fibers were intertwined with an absorbable component, polyglactin-910. Finally, the mesh in our study was implanted in abdominal tissue, not pelvic tissue. This is quite different from the use of Prolift in the female pelvis.

In another unfortunate example of the internal confusion and disparity of knowledge regarding surgical mesh and specifically, the differences between the tissues of the abdomen versus the pelvis, is seen in an email by a top R&D scientist, Joerg Holste, when He stated in

<sup>21</sup> ETH.MESH.02207388: Email dtd 10/26/08 from Jonathan Meek to Julie Bird et al regarding Prolift + M Pre-Reading



March 2007, “My thinking is that a pelvic floor prolapse is clinically comparable to hernia development, because it is part of the abdominal wall.”<sup>22</sup>

Clearly, the scientific reality weighs in favor of Dr. Robinson’s analysis much more so than Dr. Hoelste’s. More recently, Dr. Daniel Elliott of the Mayo Clinical published an article stating two very obvious concerns that should have been raised: “The first concern this should have raised regarding using synthetic mesh in the vagina is that synthetic meshes are not a perfect solution for abdominal wall hernias. A tremendous amount of data in the general surgery literature details a long litany of mesh complications...The second question or concern that should have been raised and thoroughly studied prior to widespread industry acceptance of transvaginal mesh kits is that the vagina is not the abdominal wall.”<sup>23</sup>

I agree. I also agree with Ethicon’s conclusions in its analysis just last year in 2011 regarding the biomechanical considerations for pelvic floor mesh design: “We have shown that currently there is an important need for animal models in pelvic floor research...Of course, we ultimately need to know what is happening in the human female...The development of knowledge to understand the mechanics of pelvic floor disorders is imperative; yet, we are only just beginning to determine the necessary criteria on which to base design for pelvic floor implants.”<sup>24</sup> This admission by Ethicon comes 11 years after putting Gynemesh PS on the market and 6 years after putting Prolift on the market as a “revolutionary” procedure. From the time of the launch of Prolift in 2005 until the present, Ethicon continues to lack sufficient knowledge regarding pelvic floor in vivo forces and has never adequately calculated or estimated such forces through appropriate testing.<sup>22 25 26</sup>

8

### **Strength**

Measurements of the tensile strength of human tissue indicate a maximum strength of about 20 N/cm before rupture. Estimates of maximum physiological abdominal wall tensile forces indicate a maximum of 16 N/cm for smaller defects and 32 N / cm for larger defects. These limitations should be provided in all directions and considered as the minimal limit of the force for subsequent tearing. Although testing of sufficient tensile strength in the pelvic floor has been understudied, one can assume that it would not exceed the tensile forces in the abdomen (16 N/cm).

The Gynemesh PS white paper similarly states that strength is an important property of synthetic meshes. It also states that “Although in vivo forces and exerted strains on pelvic floor repairs are difficult to quantify, it is unlikely that they are significantly different than those found in the abdomen. Synthetic meshes have been used for years in the repair of abdominal and

<sup>22</sup> ETH.00078537: Email dtd 03/07/07 from Joerg Holste regarding Lightning 510(k) requirements, “POP is part of the abdominal wall”

<sup>23</sup> Elliott, D. CON: mesh in vaginal surgery: do the risks outweigh the benefits? Wolters Kluwer Health. 2012

<sup>24</sup> ETH.MESH.02010834-ETH.MESH.02010854: February 16, 2011 report written by Jurgen Trzewik and Christophe Vailhe titled “Biomechanical consideration for Pelvic floor mesh design”

<sup>25</sup> ETH.MES.01156032: Clinical Expert Report for Gynecare Prolift Pelvic Floor Repair System

<sup>26</sup> Christoph Vailhe deposition 45:23-46:11

inguinal hernias and have proven to be of adequate strength to provide tissue support in that region. In fact, many meshes may be over-engineered with respect to strength and mesh density and weight may be able to be significantly decreased. However, the extent of this decrease and the minimum mesh strength requirement for pelvic floor repair is not known.”<sup>27</sup> It is not possible to design an appropriate surgical mesh if the surgical environment is not understood.

Holste reported in 2005 in an article “**Are Meshes with Lightweight Construction Strong Enough?**” that surgical mesh must provide sufficient biological strength to meet physiological requirements without being over engineered. He added a graph to his publication showing that the maximum tensile strength on the abdominal wall is 150mmHg. The graph demonstrates that Ethicon’s hernia meshes Ultrapro, Prolene Soft and Prolene all have burst strengths that are far above the maximum needed strength in light of the maximum abdominal pressure (Ultrapro = 650 mmHg; Prolene Soft = 700 mmHg; Prolene = 1650 mmHg). Holste correctly notes that over-engineered meshes (i.e., those whose strength is far above the maximum requirements of the tissue in which it is implanted thus leaving excessive amounts of foreign material in the body) lead to stiffness, excessive scar plate formation and abdominal wall restriction, all of which in turn lead to complications of reduced patient comfort and chronic pain. However, in that same article, he states that these meshes “possess adequate strength to repair the abdominal wall.” He has missed the point. The question is not whether the meshes have enough or adequate strength, the question for Holste and his employer, Ethicon, should have been (and continues to be even to this day) ‘Do our meshes have more material and/or more strength than is required to accomplish the task of reinforcing the tissues in which they are implanted?’. His conclusions thus belie a proper analysis of the data that he seeks to present given that Prolene Soft is over four times stronger than the maximum tensile strength of the abdomen, and Prolene is over ten times the required strength.<sup>28</sup>

Gynemesh PS/Prolene Soft is over four times stronger than the maximum tensile strength of the abdomen, and Prolene is over ten times the required strength.<sup>29</sup> Again, the main task for reinforcement by textile structures is the compensation of any tensile strength. In the case of prolapse, it should retain the pelvic floor with its organs which means there will be tension by definition. Thus, declarations or claims by Ethicon that the Prolift Kit are “tension free” are untrue and defy scientific sense or even common sense. The bearing of forces by the textile area is much more complex and hardly possible to be calculated exactly for every part of the mesh.

However, as Cosson et al.<sup>30</sup> discovered, the vaginal tissue showed rupture at a strain of about 20 N/cm. Thus, any textile does not need to be stronger than this. Considering the low forces of the surgeon to place a sling or a mesh, the necessary strength probably is in the range of 2 to 10 N /cm with variations depending on the degree of prolapse and the patient and her anatomy. However, more precise measurements or estimations are still lacking.

<sup>27</sup> ETH.MESH.02053630: Gynemesh PS “White Paper”

<sup>28</sup> ETH.MESH.02227224: PowerPoint Presentation dtd 05/09/08 titled MGPP Thunder Decision Meeting

<sup>29</sup> Holste J. Are meshes with lightweight construction strong enough? Int Surg. 2005;90:S10-S12

<sup>30</sup> Cosson M, Lambaudie E, Boukerrou M, Lobry P, Crépin G, Ego A. A biomechanical study of the strength of vaginal tissues. Results on 16 post-menopausal patients presenting with genital prolapse. Eur J Obstet Gynecol Reprod Biol. 2003 Feb 10;112(2):201-5.

Ethicon has indicated in its internal documents that a force of 12.0 lbf (53 N) is placed on the mesh arms of the Prolift during implantation and that the required forces to pull the mesh arms through the cannula to be 0.73 lbf (3.24 N).<sup>31 32</sup> It has also stated in other documents that the tensile strength of the implant straps “shall exceed 2.3 kg-force” (23 N)<sup>33</sup>

During the development of Project Thunder, it was noted by the design team that as of 2008, pelvic floor material was still over-engineered. “There is no patient-centric PF material!...we need less foreign body material and materials that correlate to measured female pelvic physiological characteristics”<sup>34</sup> Ethicon’s researchers, when developing Project Thunder, they admitted that their own “pelvic floor materials are still over-engineered.”<sup>35</sup> This would include the mesh in the Prolift.

### Elasticity

As stated in their Gynemesh PS “White Paper”, Ethicon knew the importance of a pelvic mesh that was stretchable in all directions due to the complex, dynamic, multi-axial, three dimensional nature of the pelvic region. “Designing a mesh .... First, it is important to consider rigidity / flexibility ... [this is] extremely important when considering the dynamic nature of the tissues surrounding the vagina wall. An ideal mesh would be multi-directionally stretchable, easily conforming to tissues in the region of the repair. This would reduce the amount of tension on the fixation sutures allowing the tissue to function normally.”<sup>36</sup>

Ethicon states that “Prolene Soft Mesh is knitted by a process which interlinks each fiber junction and which provides for elasticity in both directions. This construction permits the mesh to be cut into any desired shape or size without unraveling. The bi-directional elastic property allows adaptation to various stresses encountered in the body.”<sup>4</sup>

After Ethicon obtained FDA 510(k) clearance for Prolene Soft, Ethicon used the “bi-directional elasticity” language in its IFU. In 2002, when FDA cleared Gynemesh PS, the same language appeared in its IFU. In July 2007, seven years after Prolene Soft was cleared for marketing, the FDA learned that Ethicon had been selling Prolift kits for two and a half years without proper clearance. In response to Ethicon’s subsequent submissions to FDA in an effort to obtain 510(k) clearance to market both Prolift and Prolift +M, the FDA reviewer, Dr. Jiyoung Dang, questioned a number of Ethicon’s claims including its claims of bidirectional elasticity and that this property allows adaptation to various stresses encountered in the body.

Various Ethicon employees attempted to find any evidence they had to support these claims. Dr. Christophe Walther (Ethicon Germany) questioned what was meant by “bi-directional elastic properties” or “allows adaptation to physiological stresses” and asked who was responsible for

<sup>31</sup> ETH- 01754: FDA Letter stating necessary force for arm pull out

<sup>32</sup> ETH.MESH.00906445: Email dtd 01/18/08 from Vincenza Zaddem to Bryan Lisa regarding 510(k) mesh data with strength

<sup>33</sup> ETH.MESH.01992236: “Form for Test Method Applicability/Suitability”

<sup>34</sup> ETH.MESH.02227224: PowerPoint Presentation dtd 05/09/08 titled MGPP Thunder Decision Meeting

<sup>35</sup> ETH.MESH.01405170: PowerPoint Presentation dtd 6/18/07 by Cliff Volpe & Peter Meier title “Exploratory Program ‘Thunder’”

<sup>36</sup> ETH.MESH.02053630: Gynemesh PS “White Paper”

these statements. Vincenza Zaddem (Ethicon Engineer and Team Leader of Prolift +M) stated “the team felt justified to use the statement ‘bi-directional elasticity and that this property allows adaptation to various stresses encountered in the body’ because this is the same statement used in the IFUs for PROLENE Soft Mesh and GYNEMESH PS. “Since this is standard data collected for meshes, **without verifying we assumed we had data for UP demonstrating it is elastic in both directions.**” (Emphasis added).<sup>37</sup> Apparently, Ethicon also “assumed” they had this data for the Prolift but, after searching, Ethicon employees were unable to find data to support their claims and thus, they informed FDA that they would not make this claim in the IFU for the Prolift.

### **Structural Stability with regard to Strength and Elasticity**

The principle of “tension free” might be somewhat true for meshes places in the abdominal wall, the textile structures in the pelvic floor necessarily, and by definition, cannot be “tension free”. Their fixation to ligaments indicates that their function has to consider resistance against tearing stress and to prevent prolapse of the tissue under mechanical strain. Thus, any claim by Ethicon that their pelvic meshes are “tension free” is false and misleading.<sup>38</sup>

In general, the huge variety of the different settings for measuring stability, elasticity, or porosity that are applied by mesh manufacturers, hinders the direct comparison of the material properties. The elasticity is markedly less for Gynemesh PS Mesh®. During the manufacturing process the mesh used in the Prolift kit is laser cut off of a large piece of Gynemesh PS, the edges of the Prolift mesh are still frayed leaving the end of the filaments “barbed” with irregular, sharp edges. At very low strain, the Prolift arms show a considerable rolling in, sometimes referred to in Ethicon documents as “mesh curling”, “roping”, or “lack of stress-shielding”. Notably, even after relaxation of the arms after strain, the “curling” of the arms persists indicating a plastic deformation of the structure. The failure of the structure to return to its original or near original shape is known as “**lack of memory**”. The frayed edges, “roping” and “curling” under minimal strain, excessive elasticity leading to pore deformation under strain, and lack of memory after strain, all are design failures that cause Prolift to have an unsafe design that unreasonably increases the risk of injury to patients in whom it is implanted. During testing that Ethicon performed in 2000, they claimed that under 2 pounds of force, Prolene Soft mesh does not curl.<sup>39</sup> I’ve determined in my work with Prof. Muhl that this is not the case. In fact, Ethicon Medical Affairs Director, Piet Hinoul listing mesh roping as a hazard for both mesh exposure and tissue damage in his 2013 Clinical Expert Report for Prolift +M.<sup>40</sup>

11

## **V. BIOCOMPATIBILITY**

Biocompatibility of long-term implantable medical devices can be defined as ‘the ability of the device to perform its intended function, with the desired degree of incorporation in the host, without eliciting any undesirable local or systemic effects in that host’. More simply put,

<sup>37</sup> .MESH.021989933: Email datd 9/10/07 from Christoph Walther to Vincenza Zaddem regarding “Info needed for FDA – Lightning”, in which Zaddem states they “assumed they had data for UP”.

<sup>38</sup> ETH.MESH.00086463: September 3, 2009 Email from Piet Hinoul Re: Prosima take away messages

<sup>39</sup> ETH.MESH.02613708: Completion Report Design Verification for Soft Prolene Mesh/Mesh Curling

<sup>40</sup> ETH.MESH.08315779 – Piet Hinoul 2012 Prolift +M Clinical Expert Report

biocompatibility entails optimal cellular response and tissue ingrowth. Piet Hinoul, Ethicon Medical Affairs Director agrees in his deposition that it was important for Ethicon to develop a mesh construction that would ensure only the desired amount of fibrosis because “you would want to limit excessive fibrosis.”<sup>41</sup>

Histopathological investigations have shown that the amount of fibrosis is directly related to the amount of the inflammatory, cellular foreign body reaction (FBR) induced at the biomaterial/host-tissue interface. This was the primary reason we directed out early mesh research to decreasing the surface area of the mesh materials in relation to the physiological biomechanical requirement to minimize the biomaterial/host-tissue interface area. This realization and design shift led to our development of what became known as “the lightweight, large pore concept” as detailed earlier in this report. The superiority of lightweight, large pore meshes over the classical heavyweight, small pore mesh materials (like Marlex and Prolene) is now widely accepted. These large pore or “macroporous” meshes, defined as pore sizes of >1mm in all directions, after accounting for stretch and pore deformation, have a decreased surface area, and compared to classical mesh materials, they induce a reduced inflammatory reaction with a decreased amount of clinical complications.

Weyhe et al. did a comparison study of heavyweight versus lightweight meshes to evaluate whether weight and structure of PP meshes were independent determinant factors for tissue incorporation of the implant. Their conclusion was that there can be worse biocompatibility of lightweight meshes compared with heavyweight meshes, if the lightweight mesh has very small pores. “Thus, the amount of implanted mesh was not the main independent determinant of biocompatibility (expressed as successful incorporation and diminished foreign body reaction) but the size of the pores.”<sup>42</sup> As between “lightweight” or “large pore”, large pore was considered by far the most important design construct for maximum biocompatibility and thus a potential deterrent to mesh-related complications.

Not surprisingly, attempts to objectify the weight parameters or values for the best “lightweight” design were inconclusive and/or varied. A review of the scientific literature indicates that there has been no real consensus as to the categorization or definition of the weight limits by class.<sup>43,44,45,46,47,48,49</sup> In numerous documents in which they communicated their mesh

12

<sup>41</sup> Piet Hinoul Deposition 540:1-10; 544:6-17; 545:5-13; 574:25-575:18

<sup>42</sup> Weyhe D, Schmitz I, Belyaev O, Grabs R, Muller K, Uhl W, Zumtobel V. Experimental Comparison of Monofile Light and Heavy Polypropylene Meshes: Less Weight Does not Mean Less Biological Response. World J Surg. 2006 Aug;30(8):1586-91

<sup>43</sup> ETH-47802: Cobb WS, Burns JM, Peindl RD, Carbonell AM, Matthews BD, Kercher KW, Heniford BT Textile analysis of heavyweight, mid-weight, and lightweight polypropylene mesh in a porcine ventral hernia model..J Surg Res. 2006 Nov;136(1):1-7. Epub 2006 Sep 22.

<sup>44</sup> Cobb W, Kercher K, Heniford T. The Argument for Lightweight Polypropylene Mesh in Hernia Repair. Surgical Innovation. 2005; 12(1):T1-T7

<sup>45</sup> Weyhe D, Belyaev O, Buettner G, Mros K, Mueller C, Muerer K, Papapostolou G, Uhl W. In Vitro Comparison of Three Different Mesh Contructions. ANZ J. Surg. 2008; 78:55-60

<sup>46</sup> Deeken C, Abdo M, Frisella M, Matthews B. Physicomechanical evaluation of absorbable and nonabsorbable barrier composite meshes for laparoscopic ventral hernia repair. Surg Endosc. 2011; 25:1541-1552

<sup>47</sup> ETH.MESH.0081180: Prolift characteristics

<sup>48</sup> ETH.MEH.02212840: Mesh Structures chart



weight classification to FDA, surgeons and patients, Ethicon stated that Prolene Soft/Gynemesh PS/Prolift were “lightweight”. However, according to Cobb and Weyhe, at least, Ethicon’s PS mesh was “medium weight”, whereas Vypro, Ultrapro and Prolift+M would be considered “lightweight”.<sup>50 51</sup> The deposition testimony of an Ethicon Key Opinion Leader employee also reveals Ethicon’s lack of understanding as to what constitutes “lightweight”. In 2008, Vince Lucente, a urogynecologist who was the number 1 promoter of Prolift and Prolift +M, referred to Gynemesh as a “middle weight mesh”.<sup>52</sup>

Therefore, to try to overcome some of these inconsistencies and hurdles, and to try to provide valuable guidance to surgeons who are considering whether to implant a mesh and if so, which ones, we set out to create a new classification of hernia meshes. Rather than using weight as the defining parameter, we contacted major manufacturers of meshes in and collected the physicochemical data of their products with the goal of deriving a classification system that grouped meshes according to their biocompatibility.

As we stated in our published article<sup>53</sup>, it is important to note that even if a hernia mesh is considered “large pore” based upon the above classification, in order to avoid “fibrotic bridging” (discussed below), even large pore meshes must have a sufficient amount of “good pores” (>1mm in diameter, after stretch) in order to resist this consequence of the inflammatory process.

### **Foreign Body Reaction**

All experimental and clinical studies indicate that mesh products on the market today cause an initial and chronic inflammatory tissue response in the recipient after implantation. The quality of the inflammatory reaction to foreign bodies of different natures is surprisingly constant, characterized by a rapid accumulation of huge numbers of phagocytic cells, in particular, blood monocytes and tissue-derived macrophages. This type of inflammatory process is known as a foreign body reaction (FBR). It is characterized by an initial inflammatory burst caused by a release of a huge cocktail of potent inflammatory mediators which then attract other cell types including T-cells, polymorphonuclear granulocytes (PMNs), plasma cells and fibrocytes. Within a few days, this cellular activity forms an early granuloma layer recognized by the very typical foreign body giant cells and an outer layer of fibrosis with deposition of collagen. This late stage granuloma is not a static type of chronic inflammation but rather, it represents a chronic wound with an increased cell turnover even years after implantation. Monocytes and tissue-derived macrophages, at the interface and in contact with the polymer, undergo apoptotic cell death and are replaced. [Fig. 6]

We published our results in 1998 and 1999 of the histological analyses from explanted mesh from rats, dogs and humans. The tissue response in humans was almost identical to the morphological observations in the animal models. In our 1999 study, we reviewed approximately

<sup>49</sup> ETH.MESH.02227368: Meshes/Devices Chart

<sup>50</sup> ETH.MESH.04037392: Prolift+M Sales Training Program PowerPoint Presentation

<sup>51</sup> Axel Arnaud Deposition: 375:3-376:6

<sup>52</sup> ETH.MESH.0067363: Vince Lucente webinar transcript

<sup>53</sup> Klinge U, Klosterhalfen B. Modified Classification of surgical meshes for hernia repair based on the analyses of 1000 explanted meshes. *Hernia*. 2012: 1-8



350 human explant samples of various mesh modifications gathered from centers all over Europe. Even 15 years after explantation, the longest observation in our study, a persistent chronic FBR could still be detected, indicating that mesh is likely never completely inert with respect to local inflammatory processes. The persistence of this FBR is important, especially in younger patients in whom the mesh will remain for several decades. The delay before explantation of mesh for infection of up to 56 months, for chronic pain of up to 48 months and for recurrence of up to 180 months established that in many clinical studies with shorter surveys of less than 1-2 years, the morbidity rates are underestimated.<sup>54,55</sup>

### **Fibrotic Reaction**

PP filaments cause an intense inflammatory response in the abdominal wall as well as the tissues of the pelvic floor. There is increased fibrotic reaction which stimulates remodeling at the tissue/implant interface. This intense scar formation contributes to the wound contraction.<sup>56</sup>

### **Fibrotic Bridging**

In our studies from the late 1990's, in which we evaluated the inflammatory response and fibrotic reaction in the tissues at the interface with the mesh implant, we saw that that large pore mesh (Vypro) was integrated into a loose network of perifilamentous fibrosis with fat tissue present in between the fibers. In contrast, the small pore mesh was incorporated entirely in perifilamentary granulomas and scar tissue, which bridged the whole pore diameter <1 mm. This phenomenon, known as "fibrotic bridging" exists when granulomas, side by side, form a common outer fibrotic capsule joining each mesh fiber and forming a rigid "scar plate" covering the whole mesh. This scar plate leaves no space for further tissue ingrowth and leads to a number of complications including loss of elasticity and pain associated with the rigidity, shrinkage or contraction of the mesh, mesh erosion, nerve entrapment, bacterial encasement, chronic pain and dyspareunia, if used in pelvic floor repair.

With the development of Vypro, the first truly large pore mesh, we were able to increase the pore size by up to 500-600% (Vypro 3-5 mm vs. Prolene <1mm). Given that the risk of bridging fibrosis is increased by mesh with pore size < 1mm in all directions, any mesh designed with pores this small increases the risk of injury to the patient and is a less safe design than mesh with pore sizes > 1mm in all directions. Simply put: the greater the pore size or open space in between fibers, the less the risk of fibrotic bridging and formation of a rigid and potentially dangerous scar plate encapsulating the mesh. Ethicon had this information beginning in 1998.

<sup>54</sup> Klinge U, Klosterhalfen B, Muller M, Ottinger A, Schumpelick V. Shrinking of Polypropylene Mesh in vivo: An Experimental Study in Dogs. Eur J Surg. 1998; 164: 965-969

<sup>55</sup> Klinge U, Klosterhalfen B, Muller M, Schumpelick V. Foreign Body reaction to Meshes Used for the Repair of Abdominal Wall Hernias

<sup>56</sup> Steinau, G., U.Klinge, A.Tittel, H.Skopnik, V.Schumpelick (1992) Gallenblasensteine im Kindes- und Jugendalter. Akt. Chir. 27:267-9

## Effective Porosity

In approximately 2005, I applied for and received a grant to study the porosity of textile meshes in an attempt to objectify porosity in a reproducible manner. I contacted an engineer at the FH Aachen University of Applied Sciences, Thomas Muhl, and we embarked on a two-year project to create a porosity image analysis system that better characterized the pore geometry of meshes, both before and after strain. The results of this granted project were published in 2007 in the Journal of Biomedical Materials Research Part B: Applied Biomaterials.<sup>57</sup>

Our research was based on my previous work from the late 1990's that pore sizes that prevent fibrotic bridging and will permit tissue ingrowth should exceed 1 mm between two PP filaments. As stated in our publication, "To exclude large pore areas that may be provided by long and thin pores with narrow parts of pores, the pore geometry has to be evaluated as well. Therefore, only those pores and those parts of the pores are extracted, which have dimensions greater than 1mm or 1000 µm in all directions. The remaining porosity is defined as 'effective porosity'.

In connection with this litigation, Prof. Muhl performed testing on Ethicon's surgical mesh product [**Prolift/TVT Products**] using the same protocol as we used in our study in 2007 and as reported again in 2013.<sup>58 59</sup> (NOTE: An Ethicon R&D Scientist, Vincenza Zaddem, Team Leader of Prolift +M and Technical Lead of Prolift, was shown the Muhl study from 2007 and she testified that it sounded like a valid test and that she believed that it would be a good test for Ethicon to look into in order to determine the effective porosity and effective porosity under strain of their pelvic meshes.<sup>60</sup> This was again confirmed in sworn testimony by Ethicon employee, Joerg Holste and circulated numerous times within Ethicon as a "more sophisticated set up" than Ethicon's method of porosity testing.<sup>61 6263</sup> Ethicon was also aware of the concept of "effective porosity" and the necessity of maintaining pore sizes of >1mm after stretch.<sup>64 65 66</sup>

The significance of the Muhl method of testing these mesh products is that it provides useful data in terms of how the mesh, and different parts of the mesh, will perform in the human body. The first most important observation from this testing was that the effective porosity and the effective porosity under strain in Prolift produced less than optimal results. As minimal strain was applied to the test sample, the geometric shape of the pores deformed and ultimately collapsed. This deformation led to extremely small pores which would make the mesh highly

<sup>57</sup> Muhl T, Binnebosel M, Klinge U, Goedderz T. New Objective Measurement to Characterize the Porosity of Textile Implants. J Biomed Mater Res Part B: Appl Biomater. 2007; 84B:176-183

<sup>58</sup> Prof. Tomas Muhl Report

<sup>59</sup> J. Otto, et al., Elongation of textile pelvic floor implants under load is related to complete loss of effective porosity, thereby favoring incorporation of scar plates; J Biomed Mater Res A 2013 Apr 29

<sup>60</sup> Vincenza Zaddem Deposition Testimony 387:14-20

<sup>61</sup> Jorg Holste Deposition 417:9-418:22

<sup>62</sup> ETH.MESH.02184130 2008 email circulating New Objective to Characterize the Porosity of Textile Implants

<sup>63</sup> ETH.MESH.04945136 2010 email circulating New Objective to Characterize the Porosity of Textile Implants

<sup>64</sup> ETH.MESH.03021946 T-Pro Stage Gate Meeting on August 25, 2008

<sup>65</sup> ETH.MESH.02587926: When the Implant Worries the Body

<sup>66</sup> ETH.MESH.017525352: Mesh Design Argumentation Issues

susceptible to fibrotic bridging, encapsulation by a rigid scar plate and the array of potential complications that occur as a result of this inflammatory process.

Another significant observation during the porosity testing by Prof. Muhl was the “curling”, sometimes referred to as “roping”, that occurred in the mesh arms of the Prolift under minimal strain. We published an article in 2007<sup>67</sup> in which we showed the tissue reaction and fibrotic ingrowth of PP due to curling/roping of the mesh due to scar shrinkage after H&E staining. [Fig. 9] As strips of mesh begin to curl, they act similarly to small pore meshes in that the fibers become situated too close together enhancing the inflammatory response and leading to fibrotic bridging.

Yet another significant observation during the porosity testing by Prof. Muhl was the “fraying” at the edges of mesh which could be seen upon removal from the package but became markedly worse in the Prolift mesh sample at minimal strain. These frayed edges create an increased inflammatory process. When frayed edges occur in the curled arms, an even greater inflammatory process is created.

After being subjected to even minimal strain or tension, the arms in the Prolift not only curled, frayed and demonstrated deformation of the pores, they also failed to return to their original or near-original geometric shape and design. This phenomenon is known in material science as plastic deformation and is sometimes referred to as a lack of “memory”.

A mesh device that is permanently implanted in human tissue and reacts to implantation and in vivo forces in the manner in which the Ethicon meshes performed during Prof. Muhl’s testing increases the risk of injury to patients in which it is implanted and is a less safe design than products that better withstand these in vivo conditions and do not display these poor outcomes. The PVDF product is a safer design for all of the reasons stated above.

### **Mesh Contraction**

Mesh contraction, also known as mesh shrinkage, retraction, bunching or wrinkling is a common phenomenon after mesh implantation which is closely related to fibrotic bridging. [Fig. 15] Mesh contraction can be defined by a reduction of the surface area of the original implanted mesh. The surface reduction is due not to shrinkage of the mesh fibers themselves but rather to a retraction of the fibrotic scar tissues around the mesh. Retraction of the scar is a physiologic reaction of maturing scar which is characterized by a constant water loss and, consequently, a subsequent surface area decrease to an average of 60% of the former wound region. It is known to take place in the first few weeks after implantation but can last as long as 12 months or more after surgery. The medical literature and Ethicon’s own internal documents report that there is considerable mesh contraction of surgical meshes made of polypropylene.<sup>68,69,70,71,72,73,74</sup> In fact,

<sup>67</sup> Klinge U, Binneboesel M, Kuschel S, Scheussler B. Demands and properties of alloplastic implants for the treatment of stress urinary incontinence. *Expert Rev. Med. Devices*. 2007; 4(3):349-359

<sup>68</sup> ETH-47802: Cobb WS, Burns JM, Peindl RD, Carbonell AM, Matthews BD, Kercher KW, Heniford BT Textile analysis of heavyweight, mid-weight, and lightweight polypropylene mesh in a porcine ventral hernia model. *J Surg Res*. 2006 Nov;136(1):1-7. Epub 2006 Sep 22.

<sup>69</sup> Cobb W, Kercher K, Heniford T. The Argument for Lightweight Polypropylene Mesh iHernia Repair. *Surgical Innovation*. 2005; 12(1):T1-T7

the TVM group in 2006 advised Ethicon of the common occurrence of retraction or shrinkage in the Prolift arms and in the distal portion of the mesh which then creates a “cord-like” mesh.<sup>75</sup> This issue not only leads to poor coverage leading to recurrence, but will also increase the amount of foreign body reaction due to pore collapse. This phenomenon then leads to additional complications including: pain, dyspareunia, nerve entrapment, increased inflammation, urinary and fecal incontinence, urinary retention, blood vessel injury and others.

In February of 2007, Dr. Kerstin Spychaj, Ethicon R&D prepared a presentation entitled, **“State of the knowledge in ‘mesh shrinkage’ – What do we know?”** which she presented at an Ethicon Expert Meeting on February 23, 2007 at Ethicon’s Norderstedt facility. Dr. Spychaj did a literature review and concluded that the “ideal mesh” in order to avoid shrinkage would be a lightweight material (partially absorbable) with a pore size > 1mm and mild but not excessive FBR and wound contraction with swift and adequate tissue growth.<sup>76</sup> Not only had Ethicon determined that shrinkage was obviously critical to the quality of its mesh products, they knew it could cause “vaginal anatomic distortion which may eventually have a negative impact on sexual function.” Furthermore, they knew “its treatment is difficult.”<sup>77</sup> Several other Ethicon employees and/pr consultants provided sworn testify regarding the issue of mesh shrinkage.<sup>78,79,80,81</sup>

There is an email exchange date July 2004 regarding mesh contraction/shrinkage in which Axel Arnaud suggested adding “mesh shrinkage” as an additional adverse reaction in the Prolift IFU. Mesh shrinkage had not been included in the Gynemesh PS IFU. Sean O’Bryan, Ethicon Regulatory Affairs, stated that “If mesh shrinkage is a real issue, then we have an obligation to put it in.” However, he also stated that if this new adverse reaction was added, Ethicon would also have to add it to the existing Gynemesh PS IFU as a modification.<sup>82</sup> Neither mesh shrinkage nor mesh contraction was added to the original or the revised Prolift IFU, nor was it added to the Prolift+M IFU.

17

<sup>70</sup> Cobb W, Kercher K, Heniford T. The Argument for Lightweight Polypropylene Mesh in Hernia Repair. Surgical Innovation. 2005; 12(1):T1-T7

<sup>71</sup> Tunn R, Picot A, Marschke J, Gauruder-Burmester A, Sonomorphological evaluation of polypropylene mesh implants after vaginal mesh repair in women with cystocele or rectocele. Ultrasound Obstet Gynecol. 2007 Apr;29(4):449-52.

<sup>72</sup> ETH.MESH.01192895: Velemir L, Amblard J, Fatton B, Savary D, Jacquetin B, Transvaginal mesh repair of anterior and posterior vaginal wall prolapse: a clinical and ultrasonographic study. Ultrasound Obstet Gynecol (2010)

<sup>73</sup> Letouzey V, Fritel X, Pierre F, Courtieu C, Marès P, de Tayrac R. Informing a patient about surgical treatment for pelvic organ prolapse. Gynecol Obstet Fertil. 2010 Apr;38(4):255-60.

<sup>74</sup> Vollebregt A, Troelstra A, van der Vaart C. Bacterial Colonisation of collagen-coated polypropylene vaginal mesh: Are additional intraoperative sterility procedures useful? Int Urogynecol J. 2009; 20:1345-1351

<sup>75</sup> ETH.MESH.01774758: December 2006 email regarding TVM Group mesh design input

<sup>76</sup> ETH.MESH.01218361-01218367: Dr. Kerstin Spychaj, State of the knowledge in “mesh shrinkage” – What do we know? 04/05/2007

<sup>77</sup> ETH.MESH.02992139: Lightning Clinical Strategy dtd 11/22/06

<sup>78</sup> David Robinson testimony 260:5-22

<sup>79</sup> Scott Ciarrocca testimony 2012-03-29 00, (Page 340:9 to 340:12)

<sup>80</sup> Aaron Kirkemo testimony 105:14-108:16

<sup>81</sup> ETH.MESH.03924887: Meshes in Pelvic Floor Repair

<sup>82</sup> ETH.MESH.02286052: Email dtd 1/13/05 from Sean O’Bryan to Scott Ciarrocca Re: IFU Prolift

### Degradation<sup>83</sup>

Studies as early as the 1970's and 1980's demonstrated concern over the degradation/oxidation effects of polypropylene when used in the human body.<sup>84,85</sup> It was presumably due to such concerns that Ethicon adds anti-oxidative additives to its compound batches when formulating and extruding the PP resin – a process that has barely been revisited, retested or changed since the late 1960's.<sup>86</sup>

More recently, there has been growing concern regarding the degradation of PP in prosthetic mesh implants. It is believed that oxidation of the mesh occurs as a result of the chemical structure of PP and the physiological conditions to which it is subjected. This leads to embrittlement of the material, impaired tissue mobility and eventually chronic pain. Costello, et al. reported in 2007 that certain by-products of the inflammatory process causes the PP to be more susceptible to the oxidative effects of the metabolites produced by phagocytic cells during the inflammatory response. They saw cracks and other surface degradations such as peeling of the PP fibers under Scanning Electron Microscopy (SEM).<sup>87</sup>

Studies have demonstrated that PP is not biologically inert. Clave, et al. performed a comparative analysis of 100 pelvic mesh explants. The average period of removal was 790.6 days. Over 20% showed such degradation damage to the fibers. [Fig. 3] The article states that the lead author of the study had an educational position for Ethicon Europe.<sup>88</sup> Other authors have also written about the degradative effects of PP in the human body.<sup>89,90,91</sup>

The clinical implications of a degraded, oxidized surface of PP mesh fibers in human tissue are not completely known. Such degradation, depending upon the severity, can lead to cracking and peeling of the fiber's surface creating an enhanced inflammatory tissue response due to the lack of a smooth surface coming into contact with the tissue. The mesh is not at rest after implantation. As a result of the inherent nature of the physiological forces and stresses being placed on the prosthetic after implantation, the mesh will move and stretch in an anisotropic

18

<sup>83</sup> Expert Reports of Vladimir Iakovlev & Howard Jordi

<sup>84</sup> Liebert T, Chartoff R, Costgrove S. Subcutaneous Implants of Polypropylene Filaments. J.Biomed. Mater. Res. 1976; 10:939-951

<sup>85</sup> Williams D. Review Biodegradation of surgical polymers. Journal of Materials Science. 1982; 17:1233-1246

<sup>86</sup> ETH.MESH.0228619: Prolene Resin Manufacturing Specifications

<sup>87</sup> Costello C, Bachman S, Grant S, Cleveland D, Loy T, Ramshaw B. Characterization of Heavyweight and Lightweight Polypropylene Prosthetic Mesh Explants from a Single Patient. Surgical Innovation. 2007; 14(3):168-176

<sup>88</sup> Clavé A, Yahi H, Hammou JC, Montanari S, Gounon P, Clavé H., Polypropylene as a reinforcement in pelvic surgery is not inert: comparative analysis of 100 explants. J Biomed Mater Res B Appl Biomater. 2007 Oct;83(1):44-9

<sup>89</sup> Cozad MJ, Grant DA, Bachman SL, Grant DN, Ramshaw BJ, Grant SA. Materials characterization of explanted polypropylene, polyethylene terephthalate, and expanded polytetrafluoroethylene composites: spectral and thermal analysis

<sup>90</sup> Costello CR, Bachman SL, Ramshaw BJ, Grant SA., Materials characterization of explanted polypropylene hernia meshes. J Biomed Mater Res B Appl Biomater. 2010 Aug;94(2):455-62;

<sup>91</sup> Ostergard, D. Degradation, infection and heat effects of polypropylene mesh for pelvic implantation: what was known and when it was known. Int Urogynecol J. 2011; 22:771-774



manner in the tissue. This frayed surface can damage the tissue in which it is implanted leading to an increased host defense response at the tissue/implant interface.

Furthermore, the cracked and frayed fiber increases the surface area of the mesh. Increased surface area causes a more intense foreign body reaction and thus, a greater inflammatory/fibrotic response. Finally, bacteria are more likely to lodge in the cracked areas of the fiber surface in vivo thereby increasing the risk of infection which would also create a greater host defense response.

It is important to note that Ethicon hired an outside consulting firm, PA Consulting Group, to analyze its surgical mesh for the pelvic floor. In an extensive report, dated May 18, 2011, PA Consulting opined that “Polypropylene can suffer from degradation following implant....a process which initiates after a few days post implantation in animal studies.”

Numerous reasons are listed as possible causes of such degradation. In fact, one of the clinicians that PA Consulting interviewed when collecting data for the report “proposed that variability in the raw materials, and/or processing thereof, could be affecting the clinical performance and outcomes. He articulated his intention to investigate this hypothesis.” A collection of “high resolution images of excised meshes clearly show physical degradation of polypropylene filaments.” The report states that these images were collected from Prof. Klosterhalfen, but rather than include them in the report, PA Consulting says that the images are “on file”.<sup>91</sup>

Degradation of PP in the human body has been the subject of scientific journals for decades, including one of which was authored by an Ethicon consultant, and at least one internal study. Yet Ethicon claims to the FDA, surgeons and patients that the PP material in Gynemesh PS and thus, Prolift is not “subject to degradation or weakening by the action of tissue enzymes.” Internal documents reveal that there was some recognition of not only the degradative effects of PP in surgical mesh but also that Ethicon’s PVDF mesh, Pronova, was more elastic and demonstrated less degradation than PP.<sup>92</sup>

Interestingly, in the May 2013 deposition of Daniel F. Burkley, MS, ‘principal scientist’ in Ethicon’s analytical characterization department, Mr. Burkley testified that in his 34 years at Ethicon, he was “...only familiar with one study ever conducted by Ethicon regarding possible degradation of its polypropylene sutures or mesh. This was a dog study that involved Prolene suture and at least two other competitors and perhaps another suture...[that he believed] was started around 1985..” [and] “...I believe it was a cardiac [study].”<sup>93</sup> Mr. Burkley testified that the

19

<sup>91</sup> ETH.MESH.02589032: May 18, 2011 report titled “Investigating Mesh Erosion in Pelvic Floor Repair” completed by Johnson & Johnson’s PA Consulting Group

<sup>92</sup> C. Töns, B. Klosterhalfen, U. Klinge, C.J.Kirkpatrick, C. Mittermayer, V. Schumpelick (1993) Septischer Schock und multiples Organversagen in der chirurgischen Intensivmedizin. Langenbecks Arch Chir 378: 217-232

<sup>93</sup> In the United States District Court for The Southern District of West Virginia Charleston Division; In Re: Ethicon, Inc. : MDL No. 2327 Pelvic Repair System, Products Liability Litigation and Various Other Cross-Noticed Actions; May 22, 2013 30(B)(6) Deposition of Daniel F. Burkley, MS; pp 23 - 24.



Prolene suture showed degradation of the Prolene suture that was still progressing after seven years, whereas the PVDF suture showed no such degradation.<sup>94</sup>

In my opinion, it has been proven to a reasonable degree of scientific probability that surgical mesh made of PP and used in the pelvic tissues is not biologically inert and does in fact undergo degradation at the surface of the mesh fiber leading to an increased host inflammatory response. Therefore, Ethicon had a duty to test the potential degradative effects of the body's reaction to the PP mesh used in Prolift in order to determine whether the anti-oxidants that it has been using for some decades does, in fact, prevent surface cracking and peeling of the mesh fibers in the human tissue. According to their outside consulting group, they do not.

It was inappropriate, false and misleading for Ethicon to claim that their PP meshes were not subject to degradation. In fact, Piet Hinoul, Ethicon's WW Medical Director, in a 2009 presentation, stated that "[modern day meshes] are not biologically inert".<sup>95</sup>

### **Fraying/Particle Loss**

In 2000, surgeons advised Brigitte Hellhammer, an Ethicon employee, that Gynemesh surgical mesh "released particles that migrate through the vaginal wall causing pain during intercourse".<sup>96</sup> In November of 2003, Marty Weisberg, who at the time was the Senior Medical Director of Gynecare, made a note to the TVT file indicating that there had been 58 complaints of mesh fraying since 2000.<sup>97</sup> In that memo to file, he stated that "Fraying is inherent in the design and construction of the product. The mesh elongates in places; the mesh narrows in places; and small particles of Prolene might break off." Ethicon deemed elimination of particle loss as an important 'CTQ' (Critical to Quality).<sup>98</sup>

In 2003, Pariente published a study in which he evaluated the amount of material shed by different suburethral slings under certain test conditions.<sup>99</sup> Dr. Pariente's conclusion was that "the very high particle shedding for both Sparc (AMS) and TVT (Ethicon) may be of significant long term clinical concern in some quarters." TVT had the highest percentage loss of initial weight at 8.5%. Other authors have commented on the fraying phenomenon of Ethicon's TVT slings as well.<sup>100</sup>

The Pariente article then prompted the French regulatory agency, AFNOR to seek additional information from Ethicon regarding the high amount of particle loss. Ethicon employee, Gene Kammerer believed that the method that AFNOR was requesting that they use in order to

<sup>94</sup> Daniel Burkley Deposition May 23, 2013 315:8-13

<sup>95</sup> ETH.MESH.01264260: Piet Hinoul 2009 Presentation

<sup>96</sup> ETH.MESH.03924887: Meshes in Pelvic Floor Repair

<sup>97</sup> ETH.MESH.00541379: Memo to File dtd 11/18/03 from Martin Weisberg Re: Mesh Fraying for TVT Devices

<sup>98</sup> 135. ETH.MESH.00301741: Email from Dan Lamont to Jacqueline Flatow dtd 11/21/05 Re:!!!!GREAT NEWS FOR TVT LASER CUT MESH!!!!

<sup>99</sup> ETH.MESH.01221055: Pariente J-L; An independent biomechanical evaluation of commercially available suburethral slings. Issues in Women's Health

<sup>100</sup> Moalli P, Papas N, Menefee S, Albo M, Meyn L, Abramowitch D; Tensile properties of five commonly used mid-urethral slings relative to TVT. Int Urogynecol J (2008) 19:655-663

determine particle loss was unrealistic and too rigorous.<sup>102</sup> Kammerer also stated that particle loss “is most likely an aesthetic tissue”.<sup>103</sup> However, information regarding the impact of particle loss on foreign body reaction and its clinical outcomes cannot be determined. It is therefore inaccurate for him to state that there is no clinical outcome to this loss of particles.

Prof. Thomas Mang, previously discussed, investigated Prolift and Prolift+M to determine whether particulates were detectable before handling, after attempts to detach fixed particles by rubbing or ultrasound, as a consequence of trimming the mesh by 5 cm incisions, or as a consequence of dynamic strain. Fragments were detected at several points for Prolift and Prolift +M. Prof. Mang found that particulates were visible even before any handling of the products occurred; he also found that fragments of polymer detached from the mesh during handling (e.g. shaking or rubbing the mesh). More probably than not, particulates of this nature will create a host defense response that includes the same series of cellular reactions as the main portion of the mesh. Also, more probably than not, particulates scattered throughout the pelvic tissue will create an inflammatory response of some magnitude; will increase the overall foreign body reaction and inflammatory response; will increase the amount of the fibrotic reaction; and will run the risk of migrating into other parts of the body.

## VI. CLINICAL OUTCOMES/COMPLICATIONS

Poor design leads to poor outcomes. Failure of a mesh manufacturer to properly and thoroughly identify and consider the relationship between the risk of complications and its relationship to design characteristics can have drastic, dangerous and life-changing consequences for patients. Neither surgeons nor patients are charged with the responsibility of designing and testing surgical meshes in a safe manner or being apprised of the latest scientific knowledge regarding the relationship between reported complications and their relationship to potential product design defects; this burden and responsibility falls squarely, and justifiably, on the shoulders of the manufacturer. Likewise, it is the responsibility of the manufacturer, not the physician or the patient, to appropriately warn of the known or knowable safety risks that accompany a particular product.

When asked about complications related to Ethicon’s pelvic meshes, Ethicon former Director of Medical Affairs, Dr. David Robinson testified at his deposition in this matter as follows: “So what we have to do is assure that our product, per se, meets the characteristics that we are describing it having.”<sup>104</sup> If designing a safer pelvic mesh product was not possible, Ethicon had an obligation not to market the product. Had Ethicon acted safely and reasonably with regard to its design, manufacture and sale of its pelvic floor mesh products, serious harm and injury to patients could have been avoided.

Another Ethicon Medical Affairs Director, Piet Hinoul, testified that Ethicon knew of all of the complications BEFORE Prolift was launched:<sup>105</sup>

<sup>102</sup> ETH.MESH.00583446 – 5/4/06 email from Gene Kammerer re French Regulatory and Particle Loss

<sup>103</sup> ETH.MESH.0058448: Email re Urethral Sling particle loss standards and AFNOR

<sup>104</sup> David Robinson Testimony 199:9-200:2

<sup>105</sup> Hinoul trial testimony *Gross, et al. vs Gynecare, et al* 01/16/13:1151:5-1156:14; 1087:1-17; 1058:22-1059:3

- Mesh exposure that is difficult to treat and requires multiple operations;
- Serious complications with a significant effect on the quality of life for the patient;
- Narrowing of the vaginal wall;
- Significantly scarred vagina;
- Life-long risk of erosions;
- Retractions that could lead to recurrence of prolapse, postoperative pain and dyspareunia;
- Prolonged or Permanent inability to void their bladder;
- Every reoperation is considered an adverse event;
- Vaginal rigidity in the context of mesh retraction;
- Potential cause of recurrence cause by individual anatomical variation;
- Complex mesh erosion;
- Chronic pelvic pain syndrome;
- Life-changing symptoms despite multiple interventions to treat Prolift complications;
- Possible inability to achieve complete symptom resolution;
- Mesh contraction can be difficult or impossible to treat;
- Mesh contraction can cause severe pain that may never resolve despite conservative and surgical treatment;
- In the event of mesh related complications, it may be difficult to safely and effectively remove the mesh;
- Some patients will have a severe inflammatory reaction to the mesh, which will be chronic;
- The inflammatory reaction to the mesh will, in some women, result in the formation of scar plating/bridging fibrosis across the mesh. This increased the risk of complications;
- Some patients will suffer complications that will make it impossible for them to have comfortable sexual relations for the rest of their lives;

22

In his Clinical Expert Report supplement of August, 2012, Dr. Hinoul listed the multiple “harms and hazards” of Prolift +M that he said were known before both Prolift and Prolift +M went on the market to be permanently implanted in women.<sup>105</sup>

The medical literature is replete with peer-reviewed reports documenting complications with surgical mesh for pelvic organ prolapse and stress urinary incontinence.<sup>106,107,108,109,110,111,112,113,114</sup>

<sup>105</sup> ETH.MESH.08315779 – September 24, 2012 Prolift +M Clinical Expert Report by Piet Hinoul

<sup>106</sup> Klosterhalfen, B., K. Junge, and U. Klinge, The lightweight and large porous mesh concept for hernia repair. Expert Rev Med Devices, 2005. 2(1): p. 103-17.

<sup>107</sup> Elmer C., Altman D., Ellstrom Engh M., Axelsen S., Vayrynen T., and Falconer C.; Trocar-Guided Transvaginal Mesh Repair of Pelvic Organ Prolapse. ACOG Vol. 113, No. 1, January 2009

<sup>108</sup> Elmer C, Blomgren B, Falconer C, Zhang A, and Altman D; Histological Inflammatory Response to Transvaginal Polypropylene Mesh for Pelvic Reconstructive Surgery. The Journal of Urology Vol. 181, 1189-1195, March 2009

In addition, there have been ‘Ethicon Expert Meetings’ during which the issue of complications, including infection and shrinkage, were discussed.<sup>115,116</sup> I reviewed an Ethicon document entitled “WW Customer Complaints” from March 16, 2005 to July 10, 2008.<sup>117</sup> In the WW Customer Complaints document a total of 231 complaints were recorded as being received on Prolift, 145 of these reported as “Serious Injury”. The top complaints were: mesh exposure (14%); erosion (12%); pain (12%); bladder perforation (9%); dyspareunia (5%); bleeding (5%); recurrence (5%). Because Ethicon acknowledged that “It is obvious that in most cases the terms ‘**exposure**’, ‘**erosion**’, and ‘**extrusion**’ are used interchangeably”, the mesh **erosion** rate could be as high as 26% from this reporting.<sup>118</sup>

Ethicon used Prof. Klosterhalfen as an outside pathology consultant to do histological evaluations at the Duren Institute of Technology of explanted mesh samples received by Ethicon. As of April 2008, he had analyzed 100 such samples. At that time, he prepared an “Interim Report Mesh Explants Pelvic Floor Repair”.<sup>119</sup> His findings, summarized, were that “Foreign body tissue reaction followed by secondary fibrosis seems to play a special role in pelvic floor repair. This is important, because soft tissue coverage is thin in pelvic floor repair. Fibrosis and folding in this are inducing mesh erosions and ulcerations”.

In June 2009, Prof. Klosterhalfen prepared another interim report regarding his histological examination of another 172 prolapse mesh explants concluding: “In summary, therefore, FBRs and secondary fibrosis seem to play a significant role in prolapse repair...Fibrosis inevitably leads to mechanical irritation, particularly when wrinkling occurs, and should be seen as the basic cause of mesh-induced erosion and ulceration...infection is commonly observed following erosion in the vaginal mucosa.”<sup>120</sup>

23

<sup>109</sup> Jeffrey S, de Jong P: Mesh, Grafts and Kits in Pelvic Organ Prolapse Surgery: Where are we now? aSAUGR Vol. 6, No. 1 (2008)

<sup>110</sup> Blandon R, Gebhart J, Trabuco E, Klingele J, Complications from vaginally placed mesh in pelvic reconstructive surgery. Int Urogynecol J (2009) 20:523-531

<sup>111</sup> Kirschner-Hermanns R, Klinge U, Klosterhalfen B, Brehmer B, Heidenreich A; What can we learn from explanted slings and meshes in pelvic floor surgery? The Journal of Urology, 1772 Vol. 183, No. 4, Supplement (2010)

<sup>112</sup> G. Welty, U Klinge, M Stumpf, B Klosterhalfen, V Schumpelick (2000) Development of new mesh materials for hernia repair and clinical outcome of different polypropylene meshes. 35th Congress of the European Society for Surgical Research 1.-3.6.2000, Malmö, in European Surgical Research 32,S1,00: S. 3

<sup>113</sup> Altman D., Väyrynen T., Ellström Engh M., Axelsen S., Falconer C., (Transvaginal Mesh Group\*) Anterior Colporrhaphy versus Transvaginal Mesh for Pelvic-Organ Prolapse. N Engl J Med 2011;364:1826-36.

<sup>114</sup> Withagen MI, Vierhout ME, Milani AL; Does trocar-guided tension-free vaginal mesh (Prolift) repair provoke prolapse of the unaffected compartments? Int Urogynecol J. 2010 Mar;21(3):271-8. Epub 2009 Nov 10.

<sup>115</sup> Klinge U, Junge K, Stumpf M (2003) Causes of recurrence after Lichtenstein tension-free hernioplasty (letter). Hernia 7: 100-101

<sup>116</sup> 97. Krones CJ, Bohm G, Ruhl KM, Stumpf M, Klinge U, Schumpelick V (2003) Inguinal hernia on the Internet: A critical comparison of Germany and the U.K. Hernia. 2004;8: 47-52

<sup>117</sup> ETH.MESH.01819528: WW Customer Complaints – received from Carey Brennan

<sup>118</sup> ID

<sup>119</sup> ETH.MESH.00006636: Klosterhalfen B., Interim Report Mesh Explants Pelvic Floor Repair

<sup>120</sup> ETH.MESH.02157879-02157880: Klosterhalfen B., Intermediate Report – Prolapse Mesh Explants 6/2009

Mesh erosions were becoming such a problem with Prolift that Dr. Peter Meier, a Principal Scientist with Johnson & Johnson Medical in Germany, prepared a 122-page “Clinical Evaluation Report – Mesh Erosions” in September 2010.<sup>121</sup> Dr. Meier reported that, “Mesh related complications may be associated with the mesh material used for reinforcement or the surgical procedure itself. Mesh material related adverse events include infections, erosions, extrusions, mesh shrinkage, vaginal granulation tissue... Additionally, functional problems such as de novo urgency, urge incontinence, dyspareunia and nonspecific pelvic pain may also be observed in certain patient groups.” The number one factor that Dr. Meier lists as causing mesh erosions is “pore size and porosity of the mesh” as discussed previously above. Unfortunately, Dr. Meier incorrectly states in this report “...that pore size larger than 75 microns will reduce the incidence of mesh erosions.

As mentioned earlier, on May 18, 2011, Johnson & Johnson received the final PA Consulting Group report investigating mesh erosion. One of the things Johnson & Johnson asked these outside consultants to analyze was Dr. Meier’s report from September 2010. In a 50-page report<sup>122</sup>, PA Consulting reported that “Of the many variables that influence mesh erosion, pore size is listed first...transvaginal implantation has a higher risk of mesh erosion than trans-abdominal surgery...vaginal area carries many bacteria, so it is virtually impossible to insert mesh devices without contamination...If host cells cannot clear the bacteria on the mesh surface, the mesh is irreversibly contaminated and the bacteria may remain dormant for long periods with the possibility of establishing a tissue infection later...”

In addition, on December 21, 2011 Chris Vailhe prepared a paper for Ethicon entitled “Polypropylene Mesh for Pelvic Floor Repair (PFR) – Focus on Mesh Exposure – Road to Improvement”.<sup>123</sup> Vailhe chose to focus the majority of the paper on “mesh exposure” as it was the highest percentage of adverse events.

I have found in my own work, by examining explanted meshes, that pore size and geometry is the most important factor in the outcome of a tissue repair with a synthetic material. By examining explanted pelvic floor repair meshes my colleagues and I found that erosions, chronic pain and nerve damage were most commonly associated with small pore meshes.<sup>109</sup>

The same holds true in hernia repair. In examining 1,000 explanted hernia meshes, infection and pain as the reason for mesh removal was most often seen in small pore meshes.<sup>52</sup>

## VII. ALTERNATIVE DESIGN – “PROJECT THUNDER” & “PROJECT LIGHTNING”

In 2001, Dr. Bridgette Hellhammer authored an internal document titled “Meshes in Pelvic Floor Repair – Findings from literature review and interviews with surgeons”.<sup>124</sup> Her conclusions were that a pelvic floor repair using a mesh implant was plausible, and “A thinner mesh than the

<sup>121</sup> ETH.MESH.00869977-00870098 Peter Meier “Clinical Evaluation Report – Mesh Erosions”

<sup>122</sup> ETH.MESH.02589032-02589079 PA Consulting report “Investigating Mesh Erosion in Pelvic Floor Repair”

<sup>123</sup> ETH.MESH.04038032-ETH.MESH.04038055 Chris Vailhe report “Polypropylene Mesh for Pelvic Floor Repair (PFR) – Focus on Mesh Exposure – Road to Improvement

<sup>124</sup> . ETH.MESH.02017169: Hellhammer, B., Meshes in Pelvic Floor Repair – Findings from literature review and interviews with surgeons. (2001)



current Prolene mesh and with some elasticity would be well accepted. Vypro would meet these requirements. A totally nonabsorbable mesh with similar mechanical properties as Vypro would also be well accepted.”

In 2002 Ethicon obtained a German patent No. DE 10043396C1 20.06.2002 for a PVDF surgical implant.<sup>125</sup> However, as it is now known, Gynemesh PS was chosen for Prolift, apparently for no other reason that it “pre-ordained”.<sup>126</sup> The physicians who developed the TVM technique (Cosson and Jacquetin), were aware of the complications associated with Prolift mesh and implored Ethicon to consider a different mesh material in 2004, before Prolift was launched for sale. In fact, Dr. Cosson advised Ethicon employee, Scott Ciarrocca in 2003 that the problems related to mesh are “more erosion, retraction”.<sup>127</sup> In another email dated May 10, 2004, Ethicon employee Ophelie Berthier tells her co-workers that the inventors of the TVM technique, Pr. Jacquetin and Dr. Cosson are concerned about the shrinkage of mesh and its direct relationship to pain and dyspareunia.<sup>128</sup> It was well understood and recognized that the complications associated with Prolift mesh were occurring frequently enough to validate the need for a new material.

In February, 2004, during a meeting with Murty Vykarnam and Mora Melican, it was determined that erosion is still the primary concern of mesh products as it is the cause of scarring around the implant. It was also noted at that same meeting that contraction of the scar tissue has been reported and that contraction is linked to severe clinical complications.<sup>129</sup> The development of Prolift +M, a device utilizing a new material and new design for pelvic floor repair, eventually became known as “**Project Lightning**” and began in early 2006.<sup>130</sup>

Gene Kammerer, one of Ethicon’s top R&D engineers advised his colleagues that the issue they need solve is that of scar contracture of the mesh, which leads to: recurrence, pain, stiffness, erosion and dyspareunia. This information was known in April 2005, a month after Ethicon began to market and sell Prolift. Already in 2005, they were discussing whether Ultrapro was the better choice of material of the Gynemesh PS used in Prolift.

In a February 2007 PowerPoint presentation titled “Project Lightning Update”, Ophelie Berthier, Marketing Manager EMEA described the new mesh material, Ultrapro, as a partially absorbable, monofilament, large pore, pliable, vaginally compliant mesh with little memory. Ms. Berthier states that, in general surgery (hernia), Ultrapro had proven to cause less inflammation, induce less fibrosis, have better integration to host tissues, maintain the mobility of the abdominal wall, have an outstanding biocompatibility, and improve patients’ quality of life. During the first cadaver lab of Project Lightning, Dr. Lobodasch found a significantly smaller amount of “curling” in the mesh arms after implantation; after the second cadaver lab, Ethicon’s

<sup>125</sup> German Patent No. DE10043396C1 20.06.2002

<sup>126</sup> ETH.MESH.02270823: Email dtd 2/26/04 from Joshua Samon to Scott Ciarrocca, et al. Re: mesh implants – user needs

<sup>127</sup> ETH.MESH.02270724: Email dated July 19, 2003 from Cosson to Ciarrocca re mesh problems

<sup>128</sup> ETH.MESH.00584846: May, 2004 email string from Ophelie Berthier forwarding the concerns of Cosson and Jacquetin

<sup>129</sup> ETH.MESH.01220730 – Questions and Concerns raised at February 10, 2004 meeting

<sup>130</sup> ETH.MESH.00742724: PPT by Ophelie Berthier “Ethicon Women’s Health & Urology: Project Lightning Update”



Key of Opinion Leader, Dr. Vince Lucente stated, “Keep this one and throw the rest out...This feels like a piece of vaginal wall...”<sup>131</sup>

Ethicon also had a renewed interest in trying to develop Pronova (PVDF) sutures as a pelvic floor mesh. As a result, they began a new project to investigate this PVDF PFR design concept through a new project dubbed by Ethicon as “**Project Thunder**”. August 14, 2007 Project Thunder meeting minutes reported that Ultra-light PP mesh was ready, Pronova in process. Pros and cons of Pronova to PP: Pro: Softness, Elasticity, better biocompatibility, less “aging” long time breakage, easier to manufacture and sterilize. Con: “May be more expansive (sic)”. Preclinical on collagen coated PP started – histology results expected late September.<sup>132</sup>

Prolift +M using Ultrapro mesh was launched and received 510(k) clearance in May 2008, four years after the developers of the TVM technique suggested a different mesh material for use in the Prolift kit and 10 years after Ethicon had learned through the research of myself and my colleagues of safer alternative mesh designs. Also, despite the stated design and complication advantages of Prolift +M over Prolift, Ethicon continues to market and sell what they have essentially claimed as an inferior device.

As per a Power Point presentation, during the period from November 2010 to October 2011 **Project Thunder** was “killed” due to “tech push”.<sup>133</sup> Although it is unclear as to what “tech push” infers, in multiple places, Ethicon seems to focus on the fact that PVDF costs more than PP.<sup>134,135</sup> In their May 9, 2008 Thunder MGPP presentation, one slide is particularly telling. It shows the PVDF products all out-performing Gynemesh PS and Ultrapro in every design attribute except one...cost.<sup>136</sup> Project Thunder was “killed” by Ethicon despite the fact that at multiple meetings, it was described as the “holy grail” of pelvic floor meshes, whereas Project Lightning (Prolift +M) was characterized as the “quick hit”.<sup>137</sup>

The Ethicon Mesh Technology Center was also working on a “Exposure Reduction Mesh” specifically to address their need to reduce the occurrence of erosion in their products. In a 2010 PowerPoint presentation, it is noted that they need to “advance material science in PF repair by reducing mesh exposure (occurrence ~ 10%)”.<sup>138</sup> This again shows their knowledge of erosions and the importance and reducing them. In 2011, during their EWHU Pelvic Floor Pipeline Update, it was again noted that they need to create a mesh to reduce the 10% occurrence of mesh. In this presentation, they state that phase I as “What is Mesh Exposure”. This presentation comes six years after Prolift was marketed, Ethicon was still attempting to define what the term “exposure” meant and how that plays a part in the clinical implications of the mesh.

<sup>131</sup> ETH.MESH.00832555: Thunder Meeting Minutes dtd 4/12/07

<sup>132</sup> ETH.MESH.00869908: Thunder Meeting Minutes dated 8/14/07

<sup>133</sup> ETH.MESH.00562421: untitled PowerPoint update from November 2010 – October 2011

<sup>134</sup> ETH.MESH.02227224: PowerPoint Presentation dated 05/09/08 titled MGPP Thunder Decision Meeting

<sup>135</sup> ETH.MESH.00869908: Thunder Meeting Minutes dated 8/14/07

<sup>136</sup> ETH.MESH.02227224: PowerPoint Presentation dated 05/09/08 titled MGPP Thunder Decision Meeting

<sup>137</sup> ETH.MESH.01819833: GAT PPT

<sup>138</sup> ETH.MESH.071490420: WW ETHICON Mesh Technology Center Powerpoint Presentation

Ethicon was aware of the fact that 48% of complication were related to mesh. They were aware that the high erosion rates and mesh shrinkage relate to severe complications include pain, dyspareunia, recurrence and the necessity of additional surgeries.<sup>139</sup>

## VIII. SUMMARY OF OPINIONS

Prior to launching Prolift for sale in the U.S., according to their own documents, Ethicon was aware of the most important design requirements for a safe pelvic floor mesh product.

According to their documents, Ethicon also knew why these design requirements were so important in terms of patient safety.

However, as is also stated in their documents, Ethicon was aware of the challenges and uncertainties of designing a safe mesh for the pelvic floor; that the design of Prolift did not meet all their claimed optimal design requirements; and that as a result, this led to patient complaints and complications.

Ethicon has a long history of manufacturing surgical meshes that are intended to be permanently implanted by doctors in patients' bodies. They likewise have a long history of reported complications with their prosthetic meshes. With their experience from complications associated with some of the poor design characteristics in hernia meshes, Ethicon knew that poor design leads to poor outcome.

Through my team's collaborative efforts with Ethicon in the late 1990's and early 2000's, Ethicon learned that the development of an optimal surgical mesh design for any application has to consider first, the polymer; second, the biomechanics (physiological requirements) as to strength, elasticity and structural stability; and third, the structure of the device in terms of geometric design, knitting characteristics, fiber size and pore size. Ethicon knew that the result of these design considerations and choices would influence the tissue reaction, primarily the intensity of the inflammatory and fibrotic response, thereby directly affecting the biocompatibility of the device and thus the clinical outcome.

However, despite this knowledge, Ethicon failed to appropriately design and test its pelvic mesh kit, Prolift, to determine if these unintended and adverse events would occur when implanting Gynemesh PS permanently into a woman's pelvic tissues resulting in significant morbidity to women around the world. Regardless of whether or not Prolift is successful, on the one hand, by holding the pelvic organs in place, it is a disastrous failure if it leads to long-term serious complications like erosions, chronic pain, permanent sexual dysfunction, chronic wound healing issues and chronic infections, all of which have been seen and reported within the literature and in Ethicon's internal documents and its employees deposition testimony.

Ethicon has stated repeatedly in its documents that it had a very poor understanding of the biomechanics of the pelvic floor, which apparently continues to this day. As such, it is impossible to establish reliable parameters for the design of the device. Furthermore, despite Ethicon's apparent knowledge of the significant amount of mesh shrinkage experienced by

<sup>139</sup> ETH.MESH.00579556 : 2010 Mesh Platform Review

patients in whom Prolift had been implanted, the potential causes of mesh shrinkage, as well the resultant patient complications that could occur as a result of this shrinkage, they did no testing nor made any design changes to Prolift in order to reduce the occurrence of this known and serious complication. Failure by Ethicon to properly study and/or make the necessary design changes to avoid this and the other safety hazards mentioned in this report was improper, irresponsible and threatened patient safety.

I reserve the right to modify these opinions as necessary based upon any new or additional information or data that I may obtain or with which I am presented.

**IX. EXHIBITS**

All exhibits that will be used to support my finding and opinions are included above and listed below in Appendix "B"

**X. RECENT TESTIMONY**

I have testified as an expert at the following trial:


*Linda Gross , et al. vs. Gynecare, et al.*; Superior Court of New Jersey Law Division – Middlesex County Case No. MID-L-9131-08

Carolyn Lewis (2:12-cv-04301)

**XI. COMPENSATION**

I am compensated for investigation, study and consultation in the case at the rate of \$500.00 per hour.

This 30<sup>th</sup> day of June, 2014

  
Prof. Dr. med. Uwe Klinge

28

# EXHIBIT

# A

## CV Professor Dr. med. Uwe Klinge

Born at 30.4.1959 in Wilhelmshaven, Germany

Primary, secondary, high school 1964-1977 Wilhelmshaven  
 Medical school 1977-1983 RWTH Aachen

### Medical profession

**12/1983 – 2/85:** military service VKK 321, Düsseldorf

**1.3.1985:** surgical resident ship at the Surgical Department of the University Hospital at the RWTH Aachen (Head Prof. Reifferscheidt, after 12/85 Prof. Schumpelick, after 3/2010 Prof. Neumann)

**1992:** Thesis at the Department for biochemistry, Prof. Gersonde at 29.4.1985 „In-vitro investigation of the oxygen binding curve of human erythrocytes in the presence of glucose and insulin “

**15.12.1993:** Specialist for general surgery

**since 15.10.1999:** Oberarzt of the surgical Department

**1/2000** Venia legendi for Surgery, Habilitation with the title „Use of alloplastic meshes for the repair of abdominal wall hernia: optimisation by adjustment to the physiological requirements “

**Since 15.10.2000:** Principal investigator of the surgical department

**21.3.2002:** specialist for surgical intensive care medicine

**1.1.2003 – 1.11.2006:** Assistant medical director

**21.7.2004:** Specialist for visceral surgery

**13.12.2005:** appointment as a.pl. Profess

**1.11.2006-28.2.2009:** Cooperation with the Institute for applied medical engineering of the Helmholtz institute

### 1. Scientific work

- Pathophysiology and treatment of abdominal wall hernia
- Biomaterials and tissue response
- Impact of altered ECM for wound healing and cancer development
- Analysis of biological networks
- Identification of prognostic markers
- Optimisation of staplers

Member of the Editorial Board of World Journal of Gastrointestinal Surgery (WJGS)  
 Member of the scientific committee for the research program START of the university clinic  
 Member of the German Society of surgeons  
 Member of the European Hernia Society  
 Member of the German Hernia Society

## Publications

1. K.Gersonde, H.Sick, U.Klinge, W.Gauch (1984) In-vitro effects of glucose and insulin on the O<sub>2</sub> haemoglobin-dissociation curve of human red blood cells. Possible implications in the O<sub>2</sub> transport phenomena. Biomed Biochim Acta 43,3:39-43
2. U.Klinge, I.Pelzer, H.Sick, K.Gersonde (1984) Oscillation of the O<sub>2</sub> half-saturation pressure and polyphosphate levels in human red blood cells. Biomed Biochim Acta 43,3:44-5
3. T.Raguse, U.Klinge, U.Baron, Ch.Marzi (1985) Das Mammakarzinom des Mannes. Chirurg 56,12: 784-8
4. V.Schumpelick, U.Klinge, M.Pip (1987) No acid, no ulcer and Carl Schwarz. Theor Surg 1,4:214-7
5. V.Schumpelick, J.C. de Jager, U.Klinge (1987) Reparationsprinzipien der Schenkelhernie. Akt Chir 22:205-9
6. V.Schumpelick, G.Arlt, G.Winkeltau, U.Klinge (1987) Gastroduodenales Rezidivulcus: Kontroversen bei Primär- und Sekundäreingriffen. Langenbecks Arch Chir 372:189-98
7. U.Klinge, M.Weeg, V.Schumpelick (1987) Ludwik Rydygier - pioneer of gastric resection for ulcers. Theor Surg 2:148-51
8. U.Klinge, W.Kreuzer, V.Schumpelick (1989) Theodor Billroth: a surgeon who combined theory and practice, art and craft. Theor Surg 4:106-12
9. V.Schumpelick, J.C. de Jager, U.Klinge (1989) Fortlaufender zweireihiger Nahtverschluß der Schenkelbruchpforte. Chirurg 60,12:882-5
10. J.Nachtkamp, R.Bares, G.Winkeltau, U.Klinge, M.M.Lerch (1989) Gastrobronchial reflux in patients on artificial ventilation. Lancet I:160-1
11. U.Klinge, D.Kupczyk-Joeris, Th.Schubert, V.Schumpelick (1990) Hypothermie und Polytrauma - eine Kasuistik. An Int Notfallmed 25;6:436-7
12. U.Klinge, G.Steinau, A.Tittel, G.Alzen, V.Schumpelick (1990) Das COMMON CHANNEL-SYNDROM - 2 Fallberichte. Z Kinderchir 45,6:386-8
13. U.Klinge, B. Klosterhalfen, C.Töns, V. Schumpelick (1991) Blutungskomplikation als Folge einer Boluslyse nach Reanimation. DMW 116,34:1293
14. Ch.Töns, U.Klinge, D.Kupczyk-Joeris, V.M.Rötzscher, V.Schumpelick (1991) Kontrollierte Studie zur Kremasterresektion bei Shouldice-Reparation primärer Leistenhernien. Zentralbl.Chir. 116:737-743
15. G.Alzen, J.Wildberger, U.Klinge, R.W.Günther (1991) Transfemorale Extraktion eines verknöteten Swan-Ganz-Katheters durch eine F24-Schleuse. Anästh.Intensivther.Notfallmed.26:280-2
16. Ch. Töns, U.Klinge, A.Tittel, V.Schumpelick (1991) Regime zentraler Venenkatheter auf chirurgischen Intensivstationen. Akt. Chir. 26:169
17. Steinau, G., U.Klinge, A.Tittel, H.Skopnik, V.Schumpelick (1992) Gallenblasensteine im Kindes- und Jugendalter. Akt. Chir. 27:267-9
18. C. Töns, B. Klosterhalfen, U. Klinge, C.J.Kirkpatrick, C. Mittermayer, V. Schumpelick (1993) Septischer Schock und multiples Organversagen in der chirurgischen Intensivmedizin. Langenbecks Arch Chir 378: 217-232
19. U. Klinge, J Conze, W Limberg, Ch Brücker, AP Öttinger, V Schumpelick (1996) Pathophysiologie der Bauchdecken Chirurg 67:229-33
20. V. Schumpelick, J Conze, U Klinge (1996) Die präperitoneale Netzplastik in der Reparation der Narbenhernie. Eine vergleichende retrospektive Studie an 272 operierten Narbenhernien. Chirurg 67: 1028-1035
21. U Klinge, J Conze, B Klosterhalfen, W Limberg, B Obolenski, AP Öttinger, V Schumpelick (1996) Veränderungen der Bauchwandmechanik nach Mesh-Implantation. Experimentelle Veränderung der Mesh-Stabilität. Langenbecks Archiv für Chirurgie 381,6: 323-32
22. U. Klinge, A. Prescher, B. Klosterhalfen, V. Schumpelick (1997) Entstehung und Pathophysiologie der Bauchwanddefekte. Chirurg 68: 293-303



23. B. Klosterhalfen, U. Klinge, U. Henze, R. Bhardwaj, J. Conze, V. Schumpelick (1997) Morphologische Korrelation der funktionellen Bauchwandmechanik nach Mesh-Implantation. *Langenbecks Arch Chir* 382: 87-94
24. V. Schumpelick, G Arlt, U Klinge (1997) Versorgung von Nabelhernien und Narbenhernie. *Deutsches Ärzteblatt* 51/52: A 3471-6
25. Bhardwaj, RS, Henze U, Klein B, Zwadlo-Klarwasser G, Klinge U, Mittermayer Ch, Klosterhalfen B (1997) Monocyte - biomaterial interaction inducing phenotypic dynamics of monocytes: a possible role of monocyte subsets in biocompatibility. *J Mat Sci Mat Med* 8: 737-742
26. Klinge U, M Müller, Ch. Brückner, V. Schumpelick (1998) Application of three dimensional stereography to assess abdominal wall mobility. *Hernia* 2:11-14
27. Klosterhalfen, B, U. Klinge, V. Schumpelick (1998): Functional and morphological evaluation of different polypropylene-mesh modifications for abdominal wall repair. *Biomaterials* 19:2235-2246
28. M. Müller, U. Klinge, J. Conze, V. Schumpelick. (1998) Abdominal wall compliance after Marlex® Mesh implantation for incisional hernia repair. *Hernia* 2,3:113-117
29. Klinge, U, B. Klosterhalfen, J. Conze, W. Limberg, B. Obolenski, A.P. Öttinger, V. Schumpelick (1998) A modified mesh for hernia repair adapted to abdominal wall physiology. *Eur J Surg* 164: 951-960
30. U. Klinge, B. Klosterhalfen, A.P. Öttinger, V. Schumpelick (1998) Shrinking of polypropylene-meshes in-vivo (an animal study) *Eur J Surg* 164: 965-969
31. U. Klinge, B. Klosterhalfen, M. Müller, M. Anurov, A. Öttinger, V. Schumpelick (1999) Influence of Polyglactin 910 - coating on functional and morphological parameters of polypropylene-mesh modifications for abdominal wall repair. *Biomaterials* 20:613-623
32. Schumpelick, V., B Klosterhalfen, M Müller, U Klinge (1999) Minimierte Polypropylen-Netze zur präperitonealen Netzplastik (PNP) der Narbenhernie – eine prospektive randomisierte klinische Studie. *Chirurg* 70: 422-430
33. Klinge, U, H Zheng, ZY Si, V. Schumpelick (1999). Altered collagen synthesis in fascia transversalis of patients with inguinal hernia. *Hernia*, 4: 181-187
34. Klinge, U, H Zheng, ZY Si, V Schumpelick 1999. Synthesis of type I and III collagen, expression of fibronectin and matrix metalloproteinases-1 and -13 in hernial sac of patients with inguinal hernia. *Int J Surg Investigation*, 1,3: 219-227
35. Schumpelick, V, U Klinge, G Welty, B Klosterhalfen 1999. Meshes in der Bauchwand. *Chirurg*, 70: 867-887
36. U. Klinge, B. Klosterhalfen, M. Müller, V. Schumpelick 1999. Foreign body reaction to meshes used for the repair of abdominal wall hernias. *Eur J Surg* 165: 665-673
37. Peiper, Ch., C. Töns, U. Klinge, V. Schumpelick 1999: Individuelle Hernienreparation: Wann ist welche Operation indiziert?. *Minimal invasive Chirurgie* 8.3: 150-154
38. Klinge U, Schumpelick V. Eingeladener Kommentar zu: "Versorgung monströser Narbenhernien mit alloplastischem Netzmaterial in Sublay-Technik". *Acta Chir Austriaca* 31 (6): 373-374, 1999
39. Klinge, ZY Si H Zheng, V Schumpelick (2000). Abnormal collagen I to III distribution in the skin of patients with incisional hernia. *European Surgical Research* 32: 43-48
40. Klinge U, H Zheng, ZY Si, V Schumpelick (2000) Expression of extracellular matrix proteins collagen I, collagen III and fibronectin in the skin of patients with inguinal hernia. *Eur Surg Research*, 31: 480-490
41. Klosterhalfen B, Klinge U, Hermanns B, Schumpelick V (2000) Pathologie traditioneller chirurgischer Netze zur Hernienreparation nach Langzeitimplantation im Menschen. *Chirurg* 71: 43-51
42. Schumpelick V, Klinge U (2000) Leistenhernienreparation mit oder ohne Mesh? *Kliniker* 2: XX-XXII

43. Schumpelick V, Klinge U (2000) Biomaterialien in der Hernienchirurgie. Med Report A30371 D, S. 6
44. Kasperk R, Klinge U, Schumpelick V (2000) The repair of large parastomal hernias using a midline approach and a prosthetic mesh in the sublay position. Am J Surg 179, 186-188
45. Klinge U, Conze, J, Schumpelick V (2000) Laparoskopische RepARATION von Narbenhernien? Contra. Chirurgische Praxis 57,2: S. 221-226, S. 229
46. Klinge U, Klosterhalfen, B, Schumpelick, V (2000) Epidemiologie und Pathophysiologie der Bauchwanddefekte. Deutsche Gesellschaft für Chirurgie, Kongressband 2000: 195-197
47. Klosterhalfen B, Klinge U, Schumpelick V, Tietze L (2000) Polymers in hernia repair - common polyester vs. polypropylene surgical meshes. J of Mat Sci 35: (19) 4769-4776
48. Schumpelick V, M Stumpf, U Klinge (2000) Operationen an der Bauchwand (Teil 1). Zentralblatt Chir 11/00: W65-W72
49. Schumpelick V, M Stumpf, U Klinge (2000) Operationen an der Bauchwand (Teil 2). Zentralblatt Chir 12/00: W73-W81
50. Höer J, Anurov M, Titkova S, Klinge U, Töns Ch, Öttinger A, Schumpelick V (2000) Influence of suture material and suture technique on collagen fibril diameters in midline laparotomies. Eur Surg Research 32: 359-367
51. Klinge U, V. Schumpelick, B. Klosterhalfen (2001) Functional assessment and tissue response of short and long term absorbable surgical meshes. Biomaterials, 22:1415-1424
52. Klosterhalfen B, Klinge U, Tietze L, Henze U, Muys L, Mittermayer C, Bhardwaj RS (2000) Expression of heat shock protein 70 (HSP 70) at the interface of polymer-implants in vivo. J Mater Sci-Mater M 11: 175-181
53. Klinge U, Si Z, Zheng H, Schumpelick V (2001) Collagen I/III and matrix metalloproteinases MMP-1/-13 in the fascia of patients with incisional hernias. J Invest Surg 14: 47-54
54. Höer J, Klinge U, Schachtrupp A, Töns Ch, Schumpelick V (2001) Influence of suture technique on laparotomy wound healing: An experimental study in rat. Langenbecks Archives of Surgery, 386: 218-223
55. Schumpelick V, Klinge U (2001) The properties and clinical effects of various types of mesh used in hernia repair. Yearbook 2001 of the Association of Surgeons of Great Britain and Ireland, page 64-68
56. Schumpelick V, U Klinge, M Stumpf (2001) Therapie der Leistenhernie I. Zentralblatt Chir 126(5):W35-40
57. Schumpelick V, U Klinge, M Stumpf (2001) Therapie der Leistenhernie II. Zentralblatt Chir 126(5):W41-47
58. Klinge U, Stumpf M, Höer J, Schumpelick V (2001) Pathogenese der Narbenhernie. Viszeralchirurgie, 3: 138-141
59. Schumpelick V, Klinge U, Junge K, Stumpf M (2001) Biomaterialien zur Versorgung von Narbenhernien. Viszeralchirurgie 3: 126-135
60. Peiper Ch, Klinge U, Schumpelick V (2001) Komplikationen der Leistenhernienchirurgie. Acta Chir Austriaca 33,4: 173-6
61. Stumpf M, Cao Wei, Klinge U, Klosterhalfen B, Kasperk R, Schumpelick V (2001) Increased distribution of collagen type III and reduced expression of MMP-1 in patients with diverticular disease. Int J colorect dis. 16: 271-275
62. Klinge U, Stumpf M, Schumpelick V. (2001) Biomaterialien in der onkologischen Chirurgie – Aktueller Stand und Perspektiven. Der Onkologe 7,10: 1082-1088
63. Junge K, U. Klinge, M. Niewiera, P. Giboni, A. Prescher, V. Schumpelick (2001) Elasticity of the Anterior Abdominal Wall and Impact for Reparation of Incisional Hernias using Mesh Implants. Hernia (2001) 5: 113-118
64. G Welty, U Klinge, B Klosterhalfen, R Kasperk, V Schumpelick Functional impairment and complaints following incisional hernia repair with different polypropylene meshes. Hernia (2001) 5: 142-147

65. Stumpf M, Klinge U, Tittel, A, Brücker C, Schumpelick V (2001) The surgical trauma of abdominal wall incision – comparison of laparoscopic versus open surgery with three-dimensional stereography. *Surg Endoscopy* 15:1147-1149
66. Zheng H, Z Si, R Kasperk, R Bhardwaj, V Schumpelick, U Klinge, Klosterhalfen B (2002) Recurrent inguinal hernia – a disease of the collagen matrix? *World J Surg*, 26: 401-408
67. Si ZY, Bhardwaj RS, Rosch R, Mertens P, Klosterhalfen B, Klinge U (2002) Impaired balance of Type I and Type III Procollagen mRNA in Cultured Fibroblasts of Patients with Incisional Hernia. *Surgery* 131 (3): 324-331
68. Klinge U, Junge J, Stumpf M, Öttinger AP, Klosterhalfen B (2002) Functional and Morphological Evaluation of a First Low Weight, Monofile Polypropylene Mesh for Hernia Repair. *J Biomed Mat Res* 63: 129-136
69. Stumpf, M, W Cao, U Klinge, B Klosterhalfen, R Kasperk, V. Schumpelick Collagen distribution and expression of matrix metalloproteinases 1 and 13 in patients with anastomotic leakage after large bowel surgery. *Langenbecks Arch Surg* 386: 502-506
70. Junge K, Klinge U, Klosterhalfen B, Rosch R, Stumpf M, Schumpelick V (2002) Review of wound healing with reference to an unreparable abdominal hernia. *Eur J Surg*, 168: 67-73
71. Klinge U, Klosterhalfen B, Birkenhauer V, Junge K, Conze J, Schumpelick V. (2002) Impact of pore size to the scar reaction at the interface to polymers in a rat model. *J Surg Res* 103: 208-214
72. Klinge U, Klosterhalfen B, Öttinger AP, Junge K, Schumpelick V. (2002) PVDF as a new polymer for the construction of surgical meshes. *Biomaterials* 23: 3487-3493
73. Rosch R, U Klinge, H Zheng, ZY Si, Kasperk R, Klosterhalfen B, Schumpelick V. A role for the collagen I/III and MMP-1/-13 genes in primary inguinal hernia? *BMC Medical genetics* (2002) 3:2 ([www.biomedcentral.com/1471-2350/3/2](http://www.biomedcentral.com/1471-2350/3/2))
74. Höer J, Lawong G, Klinge U, Schumpelick V (2002) Einflussfaktoren der Narbenhernienentstehung. *Chirurg* 73: 474-480
75. Peiper Ch, Klinge U, Junge K, Schumpelick V (2002) Netze in der Leistenhernienchirurgie. *Zentralbl Chir* 127: 573-577
76. Klosterhalfen B, Junge K, Hermanns B, Klinge U (2002) Influence of implantation interval on the long-term biocompatibility of surgical mesh. *BJS* 89: 1043
77. Schachtrupp A, Höer J, Töns C, Klinge U, Reckord U, Schumpelick V (2002) Intra-abdominal pressure: a reliable criterion for laparotomy cosure? *Hernia* 6: 102-107
78. Höer J, Junge K, Schachtrupp A, Klinge U, Schumpelick V (2002) Influence of laparotomy closure technique on collagen synthesis in the incisional region. *Hernia* 6: 93-98
79. Junge K, U. Klinge, R. Rosch, B. Klosterhalfen, V. Schumpelick (2002): Functional and morphological properties of a modified mesh for inguinal hernia repair. *WJS* Dec;26(12):1472-80
80. Höer J, M Stumpf, R Rosch, U Klinge, V Schumpelick (2002) Prophylaxe der Narbenhernie. *Chirurg* 73: 881-887
81. Schumpelick V, K Junge, R Rosch, U Klinge, M Stumpf (2002) Retromuskuläre Netzplastik in Deutschland. *Chirurg* 73: 888-894
82. Kasperk R, S Willis, U Klinge, V Schumpelick (2002) Update Narbenhernie – Parastomale Hernie. *Chirurg* 73: 895-898
83. Klinge U, Junge K, Spellerberg B, Piroth C, Klosterhalfen B, Schumpelick V (2002) Do multifilament alloplastic meshes increase the infection rate? Analysis of the polymeric surface, the bacteria adherence and the in-vivo consequences in a rat model. *J Biomed Mat Res* 63:765-771
84. Schachtrupp, V. Fackeldey, U. Klinge, J. Hoer, A. Tittel, C. Toens, V. Schumpelick (2002): Temporary closure of the abdominal wall (laparostomy) *Hernia* (2002) 6: 155-162

85. Höer J, Klinge U, Anurov M, Titkova S, Öttinger A, Schumpelick V (2002) Tension banding closure of laparotomies: results of an experimental study in dogs. *Langenbecks Arch Surg.* 2002 Nov;387(7-8):309-314.
86. Junge K, Klinge U, Klosterhalfen B, Mertens PR, Schachtrupp A, Ullmer F, Schumpelick V (2002): Influence of mesh materials on collagen deposition in a rat model. *J Invest Surg* Nov-Dec;15(6):319-28
87. Siggelkow W, Faridi A, Spiritus K, Klinge U, Rath W, Klosterhalfen B (2003) Histological analysis of silicone breast implant capsules and correlation with capsular contracture. *Biomaterials* 24: 1101-1109
88. Schachtrupp A, Klinge U, Junge K, Rosch R, Bhardwaj RS, Schumpelick V (2003) Individual inflammatory response of human blood monocytes to mesh biomaterials. *Br J Surg* 90(1): 114-20
89. Rosch R, Junge K, Knops M, Lynen P, Klinge U, Schumpelick V (2003) Analysis of collagen-interacting proteins in patients with incisional hernias. *Langenbecks Arch Surg* 387 (11-12): 427-32
90. Junge K, Peiper C, Schachtrupp A, Rosch R, Kurten D, Klinge U, Schumpelick V (2003) Breaking strength and tissue elasticity after Shouldice repair. *Hernia* 7(1): 17-20
91. Rosch R, Junge K, Lynen P, Mertens PR, Klinge U, Schumpelick V (2003) Hernia – a collagen disease? *Eur Surg* 35 (1): 11-15
92. Stumpf M, Conze J, Klinge U, Rosch R, Schumpelick V (2003) Open mesh repair. *Eur Surg* 35 (1): 21-24
93. Rosch R, Junge K, Schachtrupp A, Klinge U, Klosterhalfen B, Schumpelick V (2003) Mesh implants in hernia repair. Inflammatory cell response in a rat model. *Eur Surg Res* 2003 May-Jun;35(3):161-6
94. Schachtrupp A, Klinge U, Schumpelick V. (2003) Temporary abdominal closure. *Hernia online*
95. Klinge U, Junge K, Stumpf M (2003) Causes of recurrence after Lichtenstein tension-free hernioplasty (letter). *Hernia* 7: 100-101
96. Krones CJ, Stumpf M, Klinge U, Schumpelick V. (2003)[Surgical options in chronic pancreatitis] *Dtsch Med Wochenschr.* 2003 Jul 25;128(30):1599-601.
97. Krones CJ, Bohm G, Ruhl KM, Stumpf M, Klinge U, Schumpelick V (2003) Inguinal hernia on the Internet: A critical comparison of Germany and the U.K. *Hernia.* 2004;8: 47-52
98. Junge K, Klinge U, Rosch R, Mertens PR, Kirch J, Klosterhalfen B, Lynen P, Schumpelick V. (2004) Decreased collagen type I/III ratio in patients with recurring hernia after implantation of alloplastic prostheses. : *Langenbecks Arch Surg.* 389:17-21
99. Junge K, Rosch R, Bialasinski L, Klinge U, Klosterhalfen B, Schumpelick V. (2003) Persistent extracellular matrix remodelling at the interface to polymers used for hernia repair. *Eur Surg Res.* 2003 Nov-Dec;35(6):497-504
100. Krones CJ, Ruhl KM, Stumpf M, Klinge U, Schumpelick V. [Information on the Internet for patients and general practitioners—critical analysis using the example of inguinal hernia] *Chirurg.* 2003 Aug;74(8):762-7. German.
101. Rosch R, Junge K, Quester R, Klinge U, Klosterhalfen B, Schumpelick V. (2003) Vypro II mesh in hernia repair: impact of polyglactin on long-term incorporation in rats. *Eur Surg Res.* 2003 Sep-Oct;35(5):445-50.
102. Junge K, Rosch R, Hoer J, Klinge U, Stumpf M, Schumpelick V Etiopathological and pathophysiological aspects of incisional hernias *CHIRURGISCHE GASTROENTEROLOGIE* 19: 1-6 Suppl. 2, 2003
103. Rosch R, Junge K, Stumpf M, Klinge U, Schumpelick V, Klosterhalfen B Requirements to an ideal mesh implant *CHIRURGISCHE GASTROENTEROLOGIE* 19: 7-11 Suppl. 2, 2003
104. Schumpelick V, Klinge U (2003) Prosthetic implants for hernia repair. *Br J Surg* 90: 1457-8

105. Schumpelick V, Klinge U, Junge K, Stumpf M. Incisional abdominal hernia: the open mesh repair. *Langenbecks Arch Surg.* 2004 Feb; 389(1): 1-5. Epub 2003 Mar 06.
106. Junge K, Klinge U, Rosch R, Mertens PR, Kirch J, Klosterhalfen B, Lynen P, Schumpelick V (2004) Decreased collagen type I/III ratio in patients with recurrent hernia after implantation of alloplastic prosthesis. *Langenbecks Arch Surg* 389: 17-22
107. Rosch R, Junge K, Lynen P, Stumpf M, Steinau G, Klinge U, Schumpelick V. (2004) A case of bilateral inguinal hernia recurrence in infancy: Investigations on collagen metabolism. *Hernia* 8: 160-163
108. Schumpelick V, Klinge U, Schwab R (2004) Stellenwert verschiedener Operationsverfahren in der Versorgung des Leistenbruchs. *Viszeralchirurgie* 39:13-19
109. Hermanns B, Klinge U, Alfer J, Rosch R, Junge K, Klosterhalfen B (2004) Pro Onkogenese und Kunststoffnetze. *Viszeralchirurgie* 39: 42-47
110. Lynen Jansen P, Klinge U, Anurov M, Titkova S, Mertens PR, Jansen M. (2004) Surgical mesh as a scaffold for tissue regeneration in the esophagus. *Eur Surg Res.* 2004 Mar-Apr;36(2):104-11.
111. Kisielinski K, Conze J, Murken AH, Lenzen NN, Klinge U, Schumpelick V (2004) The Pfannenstiel or so called "bikini cut": Still effective more than 100 years after first description. *Hernia.* 2004 Mar 2 [Epub ahead of print]
112. Siggelkow W, Klosterhalfen B, Klinge U, Rath W, Faridi A (2004) Analysis of local complications following explantation of silicone breast implants. *Breast.* 2004 Apr;13(2):122-8
113. Fackeldey V, Hoer J, Klinge U. (2004) Faszienheilung und Platzbauch. *Chirurg.* 2004 Apr 8: 477-483
114. Truong S, Bohm G, Klinge U, Stumpf M, Schumpelick V. Results after endoscopic treatment of postoperative upper gastrointestinal fistulas and leaks using combined Vicryl plug and fibrin glue. *Surg Endosc.* 2004 May 27 [Epub ahead of print]
115. Conze J, Prescher A, Klinge U, Saklak M, Schumpelick V. Pitfalls in retromuscular mesh repair for incisional hernia: The importance of the "fatty triangle". *Hernia.* 2004 Aug;8(3):255-9. Epub 2004 Jun 05
116. Jansen PL, Mertens Pr P, Klinge U, Schumpelick V. The biology of hernia formation. *Surgery.* 2004 Jul;136(1):1-4.
117. Conze J, Prescher A, Kisielinski K, Klinge U, Schumpelick V. Technical consideration for subxiphoidal incisional hernia repair. *Hernia.* 2005;9:84-87
118. Klinge U, Junge K, Mertens PR Herniosis: A biological approach. *Hernia.* 2004 Aug 4 [Epub ahead of print]
119. Conze J, Rosch R, Klinge U, Weiss C, Anurov M, Titkova S, Oettinger A, Schumpelick V. Polypropylene in the intra-abdominal position: Influence of pore size and surface area. *Hernia.* 2004 8:365-372
120. Hartmann FH, Krones CJ, Klinge U, Hermanns B, Schumpelick V (2004) Das maligne Mesotheliom – eine seltene Differentialdiagnose der Peritonealkarzinose. *Visceralchirurgie* 39: 313-316
121. Junge K, Rosch R, Klinge U, Krones C, Klosterhalfen B, Mertens PR, Lynen P, Kunz D, Preiss A, Peltroche-Llacsahuanga H, Schumpelick V. (2004) Gentamicin supplementation of polyvinylidenfluoride mesh materials for infection prophylaxis. *Biomaterials.* 2005 Mar;26(7):787-93.
122. Krones C, Klosterhalfen B, Fackeldey V, Junge K, Rosch R, Schwab R, Stumpf M, Klinge U, Schumpelick V. (2004) Deleterious Effect of Zinc in a Pig Model of Acute Endotoxemia. *J Invest Surg.* 17(5):249-256
123. Stumpf M, Klinge U, Mertens PR. [Anastomotic leakage in the gastrointestinal tract-repair and prognosis.] *Chirurg.* 2004 Nov;75(11):1056-62.



124. Siggelkow W, Faridi A, Klinge U, Rath W, Klosterhalfen B. Ki67, HSP70 and TUNEL for the specification of testing of silicone breast implants in vivo. *J Mater Sci Mater Med.* 2004 Dec;15(12):1355-60.
125. Stumpf M, Cao W, Klinge U (2005) Reduced expression of collagen type I and increased expression of matrix metalloproteinases 1 in patients with Crohn's disease. *J Investigative Surgery* 18: 1-6
126. Stumpf M, Klinge U, Wilms A, Zabrocki R, Rosch R, Junge K, Krones C, Schumpelick V. (2005) Changes of the extracellular matrix as a risk factor for anastomotic leakage after large bowel surgery. *Surgery.* 2005 Feb;137(2):229-34.
127. Krones CJ, Klosterhalfen B, Butz N, Hoelzl F, Junge K, Stumpf M, Peiper C, Klinge U, Schumpelick V. (2005) Effect of zinc pretreatment on pulmonary endothelial cells in vitro and pulmonary function in a porcine model of endotoxemia. *J Surg Res.* 2005 Feb;123(2):251-6.
128. Klinge U, Krones CJ. [Laparoscopic groin hernia repair - contra.] *Dtsch Med Wochenschr.* 2005 Mar 11;130(10):535.
129. Junge K, Rosch R, Krones CJ, Klinge U, Mertens PR, Lynen P, Schumpelick V, Klosterhalfen B. (2005) Influence of polyglecaprone 25 (Monocryl) supplementation on the biocompatibility of a polypropylene mesh for hernia repair. *Hernia.* 9;3: 212-217
130. Klinge U, Krones CJ. (2005) Can we be sure that the meshes do improve the recurrence rates? *Hernia.* 2005;9:1-2
131. En-Nia A, Yilmaz E, Klinge U, Lovett DH, Stefanidis I, Mertens PR. (2005) Transcription factor YB-1 mediates DNA-polymerase alpha gene expression. *J Biol Chem.* 2005 Mar 4;280(9):7702-11
132. Stumpf M, Cao W, Klinge U, Klosterhalfen B, Junge K, Krones C, Schumpelick V. (2005) Reduced expression of collagen type I and increased expression of matrix metalloproteinases 1 in patients with Crohn's disease. *J Invest Surg.* 2005 Jan-Feb;18(1):33-8
133. Junge K, Rosch R, Klinge U, Saklak M, Klosterhalfen B, Peiper C, Schumpelick V. (2005) Titanium coating of a polypropylene mesh for hernia repair: Effect on biocompatibility. *Hernia.* 9:115-9
134. Conze J, Junge K, Klinge U, Weiss C, Polivoda M, Oettinger AP, Schumpelick V. (2005) Intraabdominal adhesion formation of polypropylene mesh Influence of coverage of omentum and polyglactin. *Surg Endosc.* 2005 May 3; [Epub ahead of print]
135. Krones CJ, Klinge U, Butz N, Junge K, Stumpf M, Rosch R, Hermanns B, Heussen N, Schumpelick V. (2005) The rare epidemiologic coincidence of diverticular disease and advanced colonic neoplasia. *Int J Colorectal Dis.* 2005 May 12; [Epub ahead of print]
136. Klinge U, Conze J, Krones CJ, Schumpelick V. (2005) Incisional Hernia: Open Techniques. *World J Surg.* 29;8:1066-1072
137. Conze J, Klinge U, Schumpelick V (2005) [Incisional hernia.] *Chirurg.* 2005 76(9):897-909
138. Peiper C, Junge K, Klinge U, Strehlau E, Krones C, Ottinger A, Schumpelick V. The influence of inguinal mesh repair on the spermatic cord: a pilot study in the rabbit. *J Invest Surg.* 2005 Sep-Oct;18(5):273-8.
139. Krones CJ, Klosterhalfen B, Anurov M, Stumpf M, Klinge U, Oettinger AP, Schumpelick V. Missing effects of zinc in a porcine model of recurrent endotoxemia. *BMC Surg.* 2005 Oct 20;5(1):22
140. Peiper C, Junge K, Klinge U, Strehlau E, Öttinger A, Schumpelick V Is there a risk of infertility after inguinal mesh repair? Experimental studies in the pig and the rabbit. *Hernia* 2006 Mar;10(1):7-12. Epub 2005 Dec 14
141. Schwab R, Conze J, Willms A, Klinge U, Becker HP, Schumpelick V. [Management of recurrent inguinal hernia after previous mesh repair A challenge.] *Chirurg.* 2006 Jun;77(6):523-30.



142. Conze J, Klinge U, Schumpelick V. Dynamic patchplasty-a tension-free reconstruction of incisional hernias. *Langenbecks Arch Surg.* 2006 Aug;391(4):409-10. Epub 2006 May 20. No abstract available.
143. Rosch R, Junge K, Conze J, Krones CJ, Klinge U, Schumpelick V. (2005) Incisional intercostal hernia after a nephrectomy. *Hernia.* 2006 Mar;10(1):97-9. Epub 2005 Aug 5
144. Toens C, Krones CJ, Blum U, Fernandez V, Grommes J, Hoelzl F, Stumpf M, Klinge U, Schumpelick V (2005) Validation of IC-VIEW fluorescence videography in a rabbit model of mesenteric ischaemia and reperfusion. *Int J Colorectal Dis.* 2006 May;21(4):332-8. Epub 2005 Aug 19
145. Junge K, Rosch R, Klinge U, Schwab R, Peiper C, Binnebosel M, Schenten F, Schumpelick V. Risk factors related to recurrence in inguinal hernia repair: a retrospective analysis. *Hernia.* 2006 Aug;10(4):309-15. Epub 2006 May 23
146. Conze J, Junge K, Klinge U, Schumpelick V Evidenzbasierte laparoskopische Chirurgie – Narbenhernie. *Viszeralchirurgie* (2006) 41: 246-252
147. Conze J, Krones CJ, Schumpelick V, Klinge U. Incisional hernia: challenge of re-operations after mesh repair. *Langenbecks Arch Surg.* 2006 Sep 2; [Epub ahead of print]
148. Schumpelick V, U Klinge, R Rosch, K Junge. Light weight meshes in incisional hernia repair. *JMAS* (2006) 2,3: 117-123
149. Klinge U, M Binnebösel, R Rosch, P Mertens. Hernia recurrence as a problem of biology and collagen. *JMAS* (2006) 2,3: 151-154
150. Klinge U, R. Rosch , K. Junge, C. J. Krones, M. Stumpf, P. Lynen-Jansen, P. R. Mertens, V. Schumpelick. Different matrix micro-environments in colon cancer and diverticular disease. *Int J Colorectal disease* (2006) online
151. Lynen Jansen P, Klinge U, Mertens PR. Hernia disease and collagen gene regulation: are there clues for intervention? *Hernia.* 2006 Dec;10(6):486-91
152. Rosch R, Junge K, Binnebosel M, Bertram P, Klinge U, Schumpelick V. Laparoscopy and collagen metabolism. *Hernia.* 2006 Dec;10(6):507-10
153. Schumpelick V, Junge K, Klinge U, Conze J (2006) Narbenhernie – Pathogenese, Klinik, Therapie *Deutsches Ärzteblatt* 103: A2553-2560
154. Lynen Jansen P, Rosch R, Rezvani M, Mertens PR, Junge K, Jansen M, Klinge U. Hernia fibroblast lack beta-estradiol induced alterations of collagen expression. *BMC Cell Biol.* 2006 Sep 29;7:36
155. Stumpf M, Krones CJ, Klinge U, Rosch R, Junge K, Schumpelick V. Collagen in colon disease. *Hernia.* 2006 Dec;10(6):498-501.
156. Junge K, Rosch R, Anurov M, Titkova S, Ottinger A, Klinge U, Schumpelick V. Modification of collagen formation using supplemented mesh materials. *Hernia.* 2006 Dec;10(6):492-7.
157. Rosch R, Junge K, Binnebosel M, Mirgartz N, Klinge U, Schumpelick V. Improved abdominal wall wound healing by helium pneumoperitoneum. *Surg Endosc.* 2006 Oct 5; [Epub ahead of print]
158. Klinge U, Binnebosel M, Mertens PR. Are collagens the culprits in the development of incisional and inguinal hernia disease? *Hernia.* 2006 Dec;10(6):472-7.
159. Rosch R, Lynen-Jansen P, Junge K, Knops M, Klosterhalfen B, Klinge U, Mertens PR, Schumpelick V. Biomaterial-dependent MMP-2 expression in fibroblasts from patients with recurrent incisional hernias. *Hernia.* 2006 Apr;10(2):125-30. Epub 2006 Jan 11.
160. Schwab R, Schumacher O, Junge K, Binnebosel M, Klinge U, Schumpelick V. Fibrin sealant for mesh fixation in Lichtenstein repair: biomechanical analysis of different techniques. *Hernia.* 2007 Apr;11(2):139-45.
161. Junge K, Klinge U, Rosch R, Lynen P, Binnebosel M, Conze J, Mertens PR, Schwab R, Schumpelick V. Improved collagen type I/III ratio at the interface of gentamicin-supplemented polyvinylidenfluoride mesh materials. *Langenbecks Arch Surg.* 2007 Jul;392(4):465-71.

162. Rosch R, Junge K, Binnebosel M, Mirgartz N, Klinge U, Schumpelick V. Gas-related impact of pneumoperitoneum on systemic wound healing. *Langenbecks Arch Surg*. 2007 Jan 13; [Epub ahead of print]
163. Klinge U. "Experimental Comparison of Monofile Light and Heavy Polypropylene Meshes: Less Weight Does Not Mean Less Biological Response" *World J Surg*. 2007 Apr;31(4):867-8..
164. Lynen Jansen P, Kever M, Rosch R, Krott E, Jansen M, Alfonso-Jaume A, Dooley S, Klinge U, Lovett DH, Mertens PR. Polymeric meshes induce zonal regulation of matrix metalloproteinase-2 gene expression by macrophages and fibroblasts. *FASEB J*. 2007 Apr;21(4):1047-57.
165. Jansen PL, Rosch R, Jansen M, Binnebosel M, Junge K, Alfonso-Jaume A, Klinge U, Lovett DH, Mertens PR. Regulation of MMP-2 Gene Transcription in Dermal Wounds. *J Invest Dermatol*. 2007 Jul;127(7):1762-7.
166. Krones CJ, Conze J, Hoelzl F, Stumpf M, Klinge U, Möller M, Dott W, Schumpelick V, Hollender J. Chemical composition of surgical smoke produced by electrocautery, harmonic scalpel and argon beaming – a short study. *Eur Surg* (2007) 39/2: 118–121
167. Klinge U, Binneboesel M, Kuschel S, Schuessler B. Demands and properties of alloplastic implants for the treatment of stress urinary incontinence. *Expert Rev Med Devices*. 2007 May;4(3):349-359.
168. Muhl T, Binnebosel M, Klinge U, Goedderz T. New objective measurement to characterize the porosity of textile implants. *J Biomed Mater Res B Appl Biomater*. 2008 Jan;84(1):176-83.
169. To K, Zhao Y, Jiang H, Hu K, Wang M, Wu J, Lee C, Yokom DW, Stratford AL, Klinge U, Mertens PR, Chen CS, Bally M, Yapp D and Dunn SE. The phosphoinositide-dependent kinase-1 inhibitor, OSU-03012, prevents Y-box binding protein-1 (YB-1) from inducing epidermal growth factor receptor (EGFR). *Molecular Pharmacology Fast Forward*. Published on June 26, 2007 as doi:10.1124/mol.107.036111
170. Binnebosel M, Klinge U, Rosch R, Junge K, Lynen-Jansen P, Schumpelick V. Morphology, quality, and composition in mature human peritoneal adhesions. *Langenbecks Arch Surg*. 2007 Jun 29; [Epub ahead of print]
171. Klinge U, Dahl E, Mertens PR. Problem poser - how to interpret divergent prognostic evidence of simultaneously measured tumor markers? *Computational and Mathematical Methods in Medicine*. Volume 8, Issue 1 March 2007 , pages 71 - 75
172. Schwab R, Schumacher O, Junge K, Binnebosel M, Klinge U, Becker HP, Schumpelick V. Biomechanical analyses of mesh fixation in TAPP and TEP hernia repair. *Surg Endosc*. 2007 Jul 11; [Epub ahead of print]
173. Binnebosel M, Rosch R, Junge K, Flanagan TC, Schwab R, Schumpelick V, Klinge U. Biomechanical analyses of overlap and mesh dislocation in an incisional hernia model in vitro. *Surgery*. 2007 Sep;142(3):365-71.
174. Stratford AL, Habibi G, Astanehe A, Jiang H, Hu K, Park E, Shado A, Buys TP, Lam W, Pugh T, Marra M, Nielsen TO, Klinge U, Mertens PR, Aparicio S, Dunn SE. Epidermal growth factor receptor (EGFR) is transcriptionally induced by the Y-box binding protein-1 (YB-1) and can be inhibited with Iressa in basal-like breast cancer providing a potential target for therapy. *Breast Cancer Res*. 2007 Sep 17;9(5):R61 [Epub ahead of print]
175. Binnebösel M, Rosch R, Junge K, Lynen-Jansen P, Schumpelick V, Klinge U. Macrophage and T-lymphocyte Infiltrates in Human Peritoneal Adhesions Indicate a Chronic Inflammatory Disease. *World J Surg*. 2007 Dec 9; [Epub ahead of print]
176. Rosch R, Binnebösel M, Junge K, Lynen-Jansen P, Mertens PR, Klinge U, Schumpelick V. Analysis of c-myc, PAI-1 and uPAR in patients with incisional hernias. *Hernia*. 2007 Dec 4; [Epub ahead of print]
177. Klinge U, Diester FJ: Das komplexe regionale Schmerzsyndrom als Konzept für den chronischen Leistschmerz? *Chirurgische Allgemeine*, 8;11/12: S. 521

178. Klinge U, Ackermann D, Lynen-Jansen P, Mertens PR. The risk to develop a recurrence of a gastric cancer-is it independent of time? *Langenbecks Arch Surg*. 2008 Jan 4; [Epub ahead of print]
179. Klinge U. Mesh for hernia repair. *Br J Surg*. 2008 Mar 14;95(5):539-540
180. Junge K, Binnebösel M, Rosch R, Jansen M, Kämmer D, Otto J, Schumpelick V, Klinge U. Adhesion formation of a polyvinylidenfluoride/polypropylene mesh for intra-abdominal placement in a rodent animal model. *Surg Endosc*. 2008 Apr 25. [Epub ahead of print]
181. Conze J, Junge K, Weiß C, Anurov M, Oettinger A, Klinge U, Schumpelick V. New polymer for intra-abdominal meshes-PVDF copolymer. *J Biomed Mater Res B Appl Biomater*. 2008 Apr 24. [Epub ahead of print]
182. Junge K, Binnebösel M, Rosch R, Ottinger A, Stumpf M, Mühlenbruch G, Schumpelick V, Klinge U. Influence of mesh materials on the integrity of the vas deferens following Lichtenstein hernioplasty: an experimental model. *Hernia*. 2008 Jul 2. [Epub ahead of print]
183. Binnebösel M, Junge K, Schwab R, Antony A, Schumpelick V, Klinge U. Delayed Wound Healing in Sacrococcygeal Pilonidal Sinus Coincides with an Altered Collagen Composition. *World J Surg*. 2008 Oct 4. [Epub ahead of print]
184. Klosterhalfen B, Junge K, Klinge U. The lightweight and large porous mesh concept for hernia repair. *Expert Rev Med Devices*. 2005 Jan; 2(1):103-17. Review.
185. Klinge U, Fiebeler A. Analysis of survival curve configuration is relevant for determining pathogenesis and causation. *Med Hypotheses*. 2009 Feb 6. [Epub ahead of print]
186. Kaemmer DA, Otto J, Lassay L, Steinau G, Klink C, Junge K, Klinge U, Schumpelick V. The Gist of literature on pediatric GIST: review of clinical presentation. *J Pediatr Hematol Oncol*. 2009 Feb;31(2):108-12.
187. Stumpf M, Conze J, Prescher A, Junge K, Krones CJ, Klinge U, Schumpelick V. The lateral incisional hernia: anatomical considerations for a standardized retromuscular sublay repair. *Hernia*. 2009 Feb 12. [Epub ahead of print]
188. Stumpf M, Junge K, Rosch R, Krones C, Klinge U, Schumpelick V. Suture-free small bowel anastomoses using collagen fleece covered with fibrin glue in pigs. *J Invest Surg*. 2009 Mar-Apr;22(2):138-47.
189. Klinge U, Theuer S, Krott E, Fiebeler A. Absence of circulating aldosterone attenuates foreign body reaction around surgical sutures. *Langenbecks Arch Surg*. 2009 Mar 7. [Epub ahead of print]
190. Muysoms FE, Miserez M, Berrevoet F, Campanelli G, Champault GG, Chelala E, Dietz UA, Eker HH, El Nakadi I, Hauters P, Hidalgo Pascual M, Hoferlin A, Klinge U, Montgomery A, Simmermacher RK, Simons MP, Smietański M, Sommeling C, Tollens T, Vierendeels T, Kingsnorth A. Classification of primary and incisional abdominal wall hernias. *Hernia*. 2009 Jun 3. [Epub ahead of print]
191. Stumpf M, Junge K, Wendlandt M, Krones C, Ulmer F, Klinge U, Schumpelick V. Risk Factors for Anastomotic Leakage after Colorectal Surgery. *Zentralbl Chir*. 2009 Jun;134(3):242-248. Epub 2009 Jun 17. PMID: 19536719 [PubMed - as supplied by publisher]
192. Conze J, Klinge U, Schumpelick V (2009): Narbenhernien. *Der Chirurg BDC* 7, Seite 369-372
193. Tur MK, Neef I, Jost E, Galm O, Jäger G, Stöcker M, Ribbert M, Osieka R, Klinge U, Barth S. Targeted restoration of down-regulated DAPK2 tumor suppressor activity induces apoptosis in Hodgkin lymphoma cells. *J Immunother*. 2009 Jun;32(5):431-41.
194. Klink C, Binnebösel M, Kämmer D, Willis S, Prescher A, Klinge U, Schumpelick V. Haemorrhoids are related to changes of cell function in mucosa and submucosa. *Int J Colorectal Dis*. 2009 Jul 10. [Epub ahead of print]
195. Kavvadias T, Kaemmer D, Klinge U, Kuschel S, Schuessler B. Foreign body reaction in vaginally eroded and noneroded polypropylene suburethral slings in the female: a case series. *Int Urogynecol J Pelvic Floor Dysfunct*. 2009 Aug 29. [Epub ahead of print]

196. Park JK, Theuer S, Kirsch T, Lindschau C, Klinge U, Heuser A, Plehm R, Todiras M, Carmeliet P, Haller H, Luft FC, Muller DN, Fiebeler A. Growth arrest specific protein 6 participates in DOCA-induced target-organ damage. *Hypertension*. 2009 Aug;54(2):359-64. Epub 2009 Jun 29.
197. Binnebösel M, Junge K, Kaemmer DA, Krones CJ, Titkova S, Anurov M, Schumpelick V, Klinge U. Intraperitoneally applied gentamicin increases collagen content and mechanical stability of colon anastomosis in rats. *Int J Colorectal Dis*. 2009 Apr;24(4):433-40. Epub 2008 Dec 3.
198. Binnebösel M, Grommes J, Koenen B, Junge K, Klink CD, Stumpf M, Ottinger AP, Schumpelick V, Klinge U, Krones CJ. Zinc deficiency impairs wound healing of colon anastomosis in rats. *Int J Colorectal Dis*. 2009 Oct 27. PMID: 19859719
199. Junge K, Binnebösel M, Rosch R, Otto J, Kämmer D, Schumpelick V, Klinge U. Impact of proinflammatory cytokine knockout on mesh integration. *J Invest Surg*. 2009 Jul-Aug;22(4):256-62.
200. Jansen PL, Klinge U, Jansen M, Junge K. Risk factors for early recurrence after inguinal hernia repair. *BMC Surg*. 2009 Dec 9;9:18.
201. Klink CD, Binnebösel M, Lucas AH, Schachtrupp A, Klinge U, Schumpelick V, Junge K. Do drainage liquid characteristics serve as predictors for seroma formation after incisional hernia repair? *Hernia*. 2009 Dec 10. [Epub ahead of print]
202. Böhm G, Mossdorf A, Klink C, Klinge U, Jansen M, Schumpelick V, Truong S. Treatment algorithm for postoperative upper gastrointestinal fistulas and leaks using combined Vicryl plug and fibrin glue. *Endoscopy*. 2010 Apr 29. [Epub ahead of print]
203. Kaemmer D, Bozkurt A, Otto J, Junge K, Klink C, Weis J, Sellhaus B, O'Dey DM, Pallua N, Jansen M, Schumpelick V, Klinge U. Evaluation of tissue components in the peripheral nervous system using Sirius red staining and immunohistochemistry: A comparative study (human, pig, rat). *J Neurosci Methods*. 2010 Apr 22. [Epub ahead of print]
204. Klinge U, Klink CD, Klosterhalfen B. [The "ideal" mesh--more than a mosquito net] *Zentralbl Chir*. 2010 Apr;135(2):168-74. Epub 2010 Apr 8. German.
205. Kaemmer DA, Otto J, Binneboesel M, Klink C, Krones C, Jansen M, Cloer C, Oettinger A, Schumpelick V, Klinge U. Erythropoietin (EPO) Influences Colonic Anastomotic Healing in a Rat Model by Modulating Collagen Metabolism. *J Surg Res*. 2010 May 22. [Epub ahead of print]
206. Otto J, Binnebösel M, Pietsch S, Anurov M, Titkova S, Ottinger AP, Jansen M, Rosch R, Kämmer D, Klinge U. Large-pore PDS mesh compared to small-pore PG mesh. *J Invest Surg*. 2010 Aug;23(4):190-6.
207. Junge K, Binnebösel M, Kauffmann C, Rosch R, Klink C, von Trotha K, Schoth F, Schumpelick V, Klinge U. Damage to the spermatic cord by the Lichtenstein and TAPP procedures in a pig model. *Surg Endosc*. 2010 Jun 8. [Epub ahead of print]
208. Krämer NA, Donker HC, Otto J, Hodenius M, Sénégas J, Slabu I, Klinge U, Baumann M, Müllen A, Obolenski B, Günther RW, Krombach GA. A concept for magnetic resonance visualization of surgical textile implants. *Invest Radiol*. 2010 Aug;45(8):477-83.
209. Klinge U, Farman N, Fiebeler A. Evaluation of the collaborative network of highly correlating skin proteins and its change following treatment with glucocorticoids. *Theor Biol Med Model*. 2010 May 28;7:16.
210. Clerici T, Kolb W, Beutner U, Bareck E, Dotzenrath C, Kull C, Niederle B; German Association of Endocrine Surgeons. Diagnosis and treatment of small follicular thyroid carcinomas. *Br J Surg*. 2010 Jun;97(6):839-44.
211. Klink CD, Binnebösel M, Kaemmer D, Schachtrupp A, Fiebeler A, Anurov M, Schumpelick V, Klinge U. Comet-Tail-Like Inflammatory Infiltrate to Polymer Filaments Develops in Tension-Free Conditions. *Eur Surg Res*. 2010 Dec 29;46(2):73-81. [Epub ahead of print]



212. Klink CD, Binnebösel M, Lucas AH, Schachtrupp A, Grommes J, Conze J, Klinge U, Neumann U, Junge K. Serum analyses for protein, albumin and IL-1-RA serve as reliable predictors for seroma formation after incisional hernia repair. *Hernia*. 2010 Nov 9. [Epub ahead of print]
213. Junge K, Binnebösel M, von Trotha KT, Rosch R, Klinge U, P Neumann U, Lynen Jansen P. Mesh biocompatibility: effects of cellular inflammation and tissue remodelling. *Langenbecks Arch Surg*. 2011 Apr 1. [Epub ahead of print]
214. Yagi S, Doorschodt BM, Afify M, Klinge U, Kobayashi E, Uemoto S, Tolba RH. Improved Preservation and Microcirculation with POLYSOL After Partial Liver Transplantation in Rats. *J Surg Res*. 2011 May 15;167(2):e375-e383. Epub 2011 Jan 31.
215. Stoffels B, Yonezawa K, Yamamoto Y, Schäfer N, Overhaus M, Klinge U, Kalff JC, Minor T, Tolba RH. Meloxicam, a COX-2 Inhibitor, Ameliorates Ischemia/Reperfusion Injury in Non-Heart-Beating Donor Livers. *Eur Surg Res*. 2011 Jul 12;47(3):109-117. [Epub ahead of print]
216. Bittner R, Arregui ME, Bisgaard T, Dudai M, Ferzli GS, Fitzgibbons RJ, Fortelny RH, Klinge U, Kockerling F, Kuhry E, Kukleta J, Lomanto D, Misra MC, Montgomery A, Morales-Conde S, Reinpold W, Rosenberg J, Sauerland S, Schug-Paß C, Singh K, Timoney M, Weyhe D, Chowbey P. Guidelines for laparoscopic (TAPP) and endoscopic (TEP) treatment of inguinal Hernia [International Endohernia Society (IEHS)]. *Surg Endosc*. 2011 Jul 13. [Epub ahead of print] No abstract available.
217. Lindschau C, Kirsch T, Klinge U, Kolkhof P, Peters I, Fiebeler A. Dehydroepiandrosterone-Induced Phosphorylation and Translocation of FoxO1 Depend on the Mineralocorticoid Receptor. *Hypertension*. 2011 Jul 11. [Epub ahead of print]
218. Brandt CJ, Kammer D, Fiebeler A, Klinge U. Beneficial effects of hydrocortisone or spironolactone coating on foreign body response to mesh biomaterial in a mouse model. *J Biomed Mater Res A*. 2011 Dec;99(3):335-43. doi: 10.1002/jbm.a.33136. Epub 2011 Aug 23.
219. Kössler W, Fiebeler A, Willms A, ElAidi T, Klosterhalfen B, Klinge U. Formation of translational risk score based on correlation coefficients as an alternative to Cox regression models for predicting outcome in patients with NSCLC. *Theor Biol Med Model*. 2011 Jul 27;8:28.
220. Klink CD, Junge K, Binnebösel M, Alizai HP, Otto J, Neumann UP, Klinge U. Comparison of Long-Term Biocompatibility of PVDF and PP Meshes. *J Invest Surg*. 2011;24(6):292-9.
221. Staat M, Trenz E, Lohmann P, Frotscher R, Klinge U, Tabaza R, Kirschner-Hermanns R: New measurements to compare soft tissue anchoring systems in pelvic floor surgery. *J Biomed Mater Res Part B* 100B(4) (2012) 924–933
222. Fet NG, Fiebeler A, Klinge U, Park JK, Barth S, Thepen T, Tolba RH. Reduction of activated macrophages after ischaemia-reperfusion injury diminishes oxidative stress and ameliorates renal damage. *Nephrol Dial Transplant*. 2012 Mar 8. [Epub ahead of print]
223. Klink CD, Binnebösel M, Lambert A, Alizai HP, Roeth A, Otto J, Klinge U, Neumann UP, Junge K. In vitro and in vivo characteristics of gentamicin-supplemented polyvinylidene fluoride mesh materials. *J Biomed Mater Res A*. 2012 May;100(5):1195-202. doi: 10.1002/jbm.a.34066. Epub 2012 Feb 18.
224. Slabu I, Guntherodt G, Schmitz-Rode T, Hodenius M, Kramer N, Donker H, Krombach GA, Otto J, Klinge U, Baumann M. Investigation of Superparamagnetic Iron Oxide Nanoparticles for MR Visualization of Surgical Implants. *Curr Pharm Biotechnol*. 2012 Mar 1;13(4):545-51.
225. Klink CD, Binnebösel M, Alizai HP, Lambert A, Vontrotha KT, Junker E, Disselhorst-Klug C, Neumann UP, Klinge U. Tension of knotted surgical sutures shows tissue specific rapid loss in a rodent model. *BMC Surg*. 2011 Dec 21;11:36.
226. Kuehnert N, Kraemer NA, Otto J, Donker HC, Slabu I, Baumann M, Kuhl CK, Klinge U. In vivo MRI visualization of mesh shrinkage using surgical implants loaded with superparamagnetic iron oxides. *Surg Endosc*. 2011 Dec 17. [Epub ahead of print]

227. Donker HC, Kramer NA, Otto J, Klinge U, Slabu I, Baumann M, Kuhl CK. Mapping of Proton Relaxation Near Superparamagnetic Iron Oxide Particle-Loaded Polymer Threads for Magnetic Susceptibility Difference Quantification. *Invest Radiol*. 2012 May 1. [Epub ahead of print]
228. Muysoms F, Campanelli G, Champault GG, Debeaux AC, Dietz UA, Jeekel J, Klinge U, Köckerling F, Mandala V, Montgomery A, Morales Conde S, Puppe F, Simmermacher RK, Smietański M, Miserez M. EuraHS: the development of an international online platform for registration and outcome measurement of ventral abdominal wall hernia repair. *Hernia*. 2012 Apr 18. [Epub ahead of print]
229. Slabu I, Güntherodt G, Schmitz-Rode T, Krämer N, Donker H, Otto J, Kuhl C, Klinge U, Baumann M. Investigation of magnetic nanoparticles incorporated within textile hernia implants. *Biomed Tech (Berl)*. 2012 Sep 4. pii: /j/bmte.2012.57.issue-s1-M/bmt-2012-4078/bmt-2012-4078.xml. doi: 10.1515/bmt-2012-4078. [Epub ahead of print] No abstract available.
230. Nováček V, Trn TN, Klinge U, Tolba RH, Staat M, Bronson DG, Miesse AM, Whiffen J, Turquier F. Finite element modelling of stapled colorectal end-to-end anastomosis: Advantages of variable height stapler design. *J Biomech*. 2012 Aug 4. [Epub ahead of print]
231. Klinge U, Klosterhalfen B. Modified classification of surgical meshes for hernia repair based on the analyses of 1,000 explanted meshes. *Hernia*. 2012 Jun;16(3):251-8. Epub 2012 May 5.
232. Kraemer NA, Donker HC, Kuehnert N, Otto J, Schradling S, Krombach GA, Klinge U, Kuhl CK. In vivo visualization of polymer-based mesh implants using conventional magnetic resonance imaging and positive-contrast susceptibility imaging. *Invest Radiol*. 2013 Apr;48(4):200-5. doi: 10.1097/RLI.0b013e31827efd14.
233. Kirsch T, Beese M, Wyss K, Klinge U, Haller H, Haubitz M, Fiebeler A. Aldosterone modulates endothelial permeability and endothelial nitric oxide synthase activity by rearrangement of the actin cytoskeleton. *Hypertension*. 2013 Feb;61(2):501-8.
234. Klinge U, Park JK, Klosterhalfen B. "The ideal mesh?". *Pathobiology*. 2013;80(4):169-75. doi: 10.1159/000348446. Epub 2013 May 6
235. Klosterhalfen B, Klinge U. Retrieval study at 623 human mesh explants made of polypropylene - impact of mesh class and indication for mesh removal on tissue reaction. *J Biomed Mater Res B Appl Biomater*. 2013 May 19. doi: 10.1002/jbmb.32958. [Epub ahead of print]
236. Hansen NL, Barabasch A, Distelmaier M, Ciritsis A, Kuehnert N, Otto J, Conze J, Klinge U, Hilgers RD, Kuhl CK, Kraemer NA. First In-Human Magnetic Resonance Visualization of Surgical Mesh Implants for Inguinal Hernia Treatment. *Invest Radiol*. 2013 May 31. [Epub ahead of print]
237. Peeters E, De Hertogh G, Junge K, Klinge U, Miserez M. Skin as marker for collagen type I/III ratio in abdominal wall fascia. *Hernia*. 2013 Jun 22. [Epub ahead of print]
238. Kaldenhoff E, Klinge U, Klosterhalfen B, Najjari L, Maass N. Von der Prolaps- zur Problempatientin Schenken wir der Qualität von Netzimplantaten genügend Aufmerksamkeit? *vorGynäkologe* 2013; 1-7
239. Otto J, Kaldenhoff E, Kirschner-Hermanns R, Mühl T, Klinge U. Elongation of textile pelvic floor implants under load is related to complete loss of effective porosity, thereby favoring incorporation in scar plates. *J Biomed Mater Res A*. 2013 Apr 29. doi: 10.1002/jbm.a.34767. [Epub ahead of print]
240. Klink CD, Schickhaus P, Binnebösel M, Jockenhoevel S, Rosch R, Tolba R, Neumann UP, Klinge U. Influence of 4% icodextrin solution on peritoneal tissue response and adhesion formation. *BMC Surg*. 2013 Sep 10;13(1):34. [Epub ahead of print]
- 241.



## published abstracts

1. V.Schumpelick, J.Faß, U.Klinge, W.Effendy: Das Risiko in der Magen Chirurgie. Häring, Berlin Alterschirurgie, 1986
2. Nachtkamp, J., R. Bares, G.Winkeltau, U.Klinge, V.Schumpelick, U.Büll (1988) Gastro-bronchialer Reflux unter Streßulkusprophylaxe - Ursache von broncho-pulmonalen Infektionen bei Beatmungspatienten. Acta Chir. Austria 20:244-5
3. J. Nachtkamp, R. Bares, G. Winkeltau, U. Klinge, M.M. Lerch, V. Schumpelick, U. Büll (1989) Gastrobronchialer Reflux, Ursache von nosokomialen Pneumonien unter Streßulkusprophylaxe. Langenbecks Arch Chir (Suppl Chir Forum):103-7
4. Ch.Töns, G.Alzen, J.Braun, U.Klinge, V.Schumpelick (1989) Zur Wertigkeit des Defäkogramms bei der Diagnostik der anorektalen Inkontinenz. Langenbecks Arch Chir Suppl 2:796-7
5. U.Klinge, G.Steinau, A.Tittel, G.Alzen, V.Schumpelick (1990) The COMMON CHANNEL-SYNDROM - a rare cause of hyperamylasemia in childhood. Kongreßband, Thieme Verlag p. 191-4
6. G. Steinau, U.Klinge, A.Tittel, V.Schumpelick (1990) Cholelithiasis in Childhood. Kongreßband, Thieme Verlag p. 177-8
7. U.Klinge (1992) Epidemiologie und Pathogenese der Cholelithiasis. Chir. Gastroenterologie Bd. 8 Suppl. 2:6-14
8. U.Klinge (1992) Postoperative Intensivmedizin bei akuter Pankreatitis: Lavage Chir. Gastroenterologie Bd. 8 Suppl. 2:108-111
9. Schumpelick,V., Braun, J., Willes, S., Klinge,U.: Darmdistraktion zur Oberflächenvergrößerung und progressives Pneumoperitoneums. Langenbecks Arch. Chir. Suppl. II (Kongreßbericht), 245-250, 1995
10. U. Henze, U Klinge, D Klee, M Anurov, B Klein, B Klosterhalfen (1996) Heat shock protein 70 (HSP 70) in the interface of biomaterials polymers in medicine & surgery 1.-3.July 1996, Glasgow UK, Kongreßband, p 269-76
11. Schumpelick, V., J. Conze, U. Klinge, G Arlt (1998) Preperitoneal mesh repair of incisional hernia. American Hernia society, Annual meeting, 6.-8.2.1998 Miami Beach, Florida. Hernia 2 Suppl.1: S8
12. U. Klinge (1998) Abdominal wall: Function, defectrs and repair. Mitteilungen der DGC, 27,3:S.155
13. U. Klinge (1998) Die Entwicklung eines an die physiologischen Belastungen angepassten Polypropylen-Meshes zur Reparation von Bauchwandhernien. Zentrbl Chir 9: 1093
14. U. Klinge, B. Klosterhalfen, V. Schumpelick (1999): Alteration of collagen metabolism in hernia patients and consequences for the therapeutic approach. 21. Congress der European hernia society, 3.-6.11.1999, Madrid Hernia, S74
15. J. Conze, U. Klinge, A. Öttinger, V. Schumpelick (1999) Adhesion formation after intraperitoneal –onlay-meshplastic (IPOM) with a modified polypropylen mesh. A new rabbit model. 21. Congress der European hernia society, 3.-6.11.1999, Madrid, Hernia, S74
16. G. Welty, U. Klinge, M. Stumpf, B. Klosterhalfen, V. Schumpelick (1999) Experiences with a novel low-weight large-pore mesh for incisional hernia repair. 21. Congress der European hernia society, 3.-6.11.1999, Madrid, Hernia, S71
17. B. Klosterhalfen, U. Klinge, V. Schumpelick (1999) Tissue and cellular response to long-term implanted surgical meshes in humans. 21. Congress der European hernia society, 3.-6.11.1999, Madrid, Hernia S 75
18. R. Kasperk, U. Klinge, V. Schumpelick (1999) New operative strategy for the repair of large parastomal hernias. 21. Congress der European hernia society, 3.-6.11.1999, Madrid, Hernia S92

19. M. Stumpf, U. Klinge, G. Welty, V. Schumpelick (1999) Assessment of surgical trauma after abdominal wall incision with three-dimensional stereography. 21. Congress der European hernia society, 3.-6.11.1999, Madrid, Hernia S 92
20. G. Welty, U. Klinge, M. Stumpf, B. Klosterhalfen, V. Schumpelick (2000) Development of new mesh materials for hernia repair and clinical outcome of different polypropylene meshes. 35 th Congress of the European Society for Surgical Research 1.-3.6.2000, Malmö, in European Surgical Research 32,S1,00: S. 3
21. Kasperk, R, U. Klinge, V. Schumpelick (2000) Reparation großer Narbenhernien mittels nicht resorbierbarer Netze in Sublay-Technik. Deutsche Gesellschaft für Chirurgie Kongreßbericht 2000, S. 925,
22. Klinge U, Klosterhalfen B, Schumpelick V (2000) Epidemiologie und Pathophysiologie der Bauchwanddefekte. Kongreßband der DGfC, S. 195- 197
23. Peiper C, Klosterhalfen B, Junge K, Bühner A, Klinge U, Schumpelick V (2001) The effect of a preperitoneal polypropylene mesh on the spermatic cord in the pig. XXXVIth Congress of the European Society for Surgical Research, 6-9.6.2001, Santiago de Compostella, Spanien. Eur Surg Res 33: 182
24. Höer J, Gawong AG, Klinge U, Schumpelick V (2001) Influencing factors for incisional hernia development after primary laparotomies. Retrospective Analysis of 2938 patients. XXXVIth Congress of the European Society for Surgical Research, 6-9.6.2001, Santiago de Compostella, Spanien. Eur Surg Res 33: 115
25. Stumpf M, Cao W, Klinge U, Klosterhalfen B, Kasperk R, Schumpelick V (2001) Colalgen metabolism and diverticular disease. XXXVIth Congress of the European Society for Surgical Research, 6-9.6.2001, Santiago de Compostella, Spanien. Eur Surg Res 33: 167
26. Höer J, Junge K, Klinge U, Töns C, Schumpelick V (2001) Influence of suture material and suture technique on the fascial wound healing in rats. 23. International congress of the EHS, Milano 21-23.6.2001, Hernia 5 Suppl 1 2001, p. S46
27. Junge C, Peiper C, Klinge U, Schumpelick V (2001) Elasticity of the abdominal wall in comparison to surgical meshes. 23. International congress of the EHS, Milano 21-23.6.2001, Hernia 5 Suppl 1 2001, p. S47
28. Klinge U, Junge K, Klosterhalfen B, Schumpelick V (2001) Functional and histological investigation of a novel low weight mesh of polypropylene monofilaments in a rat model. 23. International congress of the EHS, Milano 21-23.6.2001, Hernia 5 Suppl 1 2001, p. S47
29. Peiper C, Klosterhalfen B, Junge K, Bühner A, Klinge U, Schumpelick V (2001) The reaction of the structures of the spermatic cord on a preperitoneal polypropylene mesh in the pig. 23. International congress of the EHS, Milano 21-23.6.2001, Hernia 5 Suppl 1 2001, p. S48
30. Klosterhalfen B, Klinge U, Canino V (2001) Complications of surgical meshes – results of the first post implantation retrieval study. 23. International congress of the EHS, Milano 21-23.6.2001, Hernia 5 Suppl 1 2001, p. S42
31. Kasperk R, Klinge U, Stumpf M, Riesener KP, Schumpelick V (2001) New technique for the repair of a parastomal hernia. 23. International congress of the EHS, Milano 21-23.6.2001, Hernia 5 Suppl 1 2001, p. S61
32. Junge K, Klinge U, Peltrosche-Llacsahuanga, Klosterhalfen B, Kunz D, Schumpelick V (2002) Infection prophylaxis by gentamycin supplementation of polyvinylidenfluoride mesh materials for abdominal wall repair. Arbeitstagung der CAB Berlin 18/19.1.2002, in Eur J Trauma 28: 125
33. Junge K, Klinge U, Klosterhalfen B, Bialasinski L, Schumpelick V (2001) Influence of textile structure of surgical meshes on tissue ingrowth in a rat model. 1<sup>st</sup> Biennial meeting of the ETES, Freiburg 7-10.11.2001, in tissue engineering 2001, 7: 638
34. Peiper Ch, Klosterhalfen B, Junge K, Bühner A, Klinge U, Schumpelick V (2001) Der Einfluß des inguinalen Polypropylen-Mesh auf die Strukturen des Samenstranges im Tierversuch. Kongressband der DGfC S. 871f

35. Junge K, Rosch R, Conze J, Klinge U, Schumpelick V (2002) Einfluß der Mesh-Qualität auf die Quantität und Qualität der Kollagenbildung im Nagermodell. Zeitschr für Wundheilung 4/02: S. 151
36. Junge K, Rosch R, Knops M, Lynen P, Mertens PR, Klinge U, Schumpelick V: Mesh in hernia repair: Influence on fibrogenesis Langenbecks Arch. Surg (2002) 387: 255
37. Rosch R, Junge K, Klinge U, Lynen P, Schumpelick V: Matrix metalloproteinases MMP 1/13 – indicators for the development of incisional hernia? Langenbecks Arch. Surg (2002) 387: 253
38. U Klinge, M. Binnebösel. Anatomic limitations for mesh positioning. Hernia (2006) abstract book: 8
39. U Klinge, M Binnebösel. Hernia recurrence as a problem of biology and collagen. Hernia (2006) abstract book: 27
40. no longer actualised .....

## Contributions to books

1. M.Pfeiffer, F.A.Pieper, U.Klinge (1987) Leberabszesse. in Chirurgie der Leber. Hrsg. V.Schumpelick, R.Pichlmayr. Springer-Verlag p.99-108
2. U.Klinge (1990) Die innere Hernie. in Hernien. Hrsg. V.Schumpelick. Ferdinand Enke Verlag p. 249ff
3. U.Klinge, V. Schumpelick, N.Bleese, H. Pokar, W.Rödiger (1994): Postoperative Therapie. Kapitel 3 in 3. Auflage "Chirurgie", Hrsg. V. Schumpelick, N.M. Bleese, U.Mommsen, Enke-Verlag Stuttgart 1984
4. U.Klinge (1994) Infektion, systemische Entzündungsantwort und Mediatoren. In "Die diffuse Peritonitis", Wissenschaftliche Verlagsgesellschaft mbH Stuttgart, Hrsg. G. Winkeltau.
5. Klosterhalfen, B, U Klinge, G Winkeltau (1998) Infektion, systemische Entzündungsantwort und Mediatoren. In "Die diffuse Peritonitis", Wissenschaftliche Verlagsgesellschaft mbH Stuttgart, pp 27-81 Hrsg. G. Winkeltau.
6. U. Klinge (1995) Meshes: Experimental Results and Review of the Literature. in: Schumpelick, V., Wantz, GE (eds.): Inguinal Hernia Repair. Karger-Verlag 1995, pp 182-194
7. U. Klinge (1995) Complications in open surgery. in: Schumpelick, V., Wantz, GE (eds.): Inguinal Hernia Repair. Karger-Verlag 1995, pp 326-339
8. U. Klinge (1995) Alloplastische Netze in Hernien, Hrsg. V. Schumpelick Seite 78-88
9. U. Klinge (1997) Venöse und arterielle Katheter. in Chirurgische Notfall- und Intensivmedizin. Hrsg. Töns-Schumpelick, Enke-Verlag
10. U. Klinge (1997) Langzeit-Beatmung und Entwöhnung. in Chirurgische Notfall- und Intensivmedizin. Hrsg. Töns-Schumpelick, Enke-Verlag
11. Klosterhalfen, B, U Klinge (1999) Biocompatibility of biomaterials – histologic aspects. In Schumpelick, V. Abdominal wall: function, defects and repair. Springer-Verlag
12. Klinge, U., B Klosterhalfen (1999) Biomaterial – experimental aspects. In Schumpelick, V. Abdominal wall: function, defects and repair. Springer-Verlag
13. Conze, J, U Klinge (1999) Biomaterial – mechanical aspects. In Schumpelick, V. Abdominal wall: function, defects and repair. Springer-Verlag
14. Schumpelick, V, U Klinge (1999) Intermediate follow-up results of sublay polypropylen repair in primary and recurrent incisional hernias. In Schumpelick, V. Abdominal wall: function, defects and repair. Springer-Verlag
15. U. Klinge, V. Schumpelick (2000) Epidemiologie. In "Hernien", Hrsg. V. Schumpelick, Georg Thieme-Verlag Stuttgart, New York, 4. Aufl.
16. U. Klinge, V. Schumpelick (2000) Pathogenese. In "Hernien", Hrsg. V. Schumpelick, Georg Thieme-Verlag Stuttgart, New York, 4. Aufl.
17. U. Klinge, V. Schumpelick (2000) Geschichte der Hernienchirurgie. In "Hernien", Hrsg. V. Schumpelick, Georg Thieme-Verlag Stuttgart, New York, 4. Aufl.
18. U. Klinge, V. Schumpelick (2000) Reparations-Prinzipien. In "Hernien", Hrsg. V. Schumpelick, Georg Thieme-Verlag Stuttgart, New York, 4. Aufl.
19. U. Klinge, V. Schumpelick (2000) Innere Hernien. In "Hernien", Hrsg. V. Schumpelick, Georg Thieme-Verlag Stuttgart, New York, 4. Aufl.
20. Conze J, Klinge U, Schumpelick V (2001) Hernias. In RG Holzheimer, JA Mannick: Surgical Treatment – Evidence-based and problem-orientated, Zuckerschwerdt Verlag münchen, S. 611-619
21. B Klosterhalfen, U Klinge, V Schumpelick Carcinogenity of implantable biomaterials. in R Bendavid: Abdominal wall hernias. Springer-Verlag 2001, page 235-236
22. U Klinge, B Klosterhalfen, V Schumpelick Vypro®: A new generation polypropylene mesh. in R Bendavid: Abdominal wall hernias. Springer-Verlag 2001, page 286-291
23. Brunn A, Klinge U, Kasperk R: Matrixmetalloproteinasen und ihr Einfluß auf die Pathogenese der Divertikelerkrankung. Eine immunhistochemische und morphometrische Studie. in Divertikulitis Hrsg Schumpelick, Kasperk Springer-Verlag Berlin 2001 S. 51-56

24. Klinge U, Prescher A, Schumpelick V: Anatomy and physiology of the abdominal wall. In Morales-Conde: Laparoscopic ventral hernia repair 2002, 37-51, Springer-Verlag
25. U.Klinge, J.Conze, M.Anurov, S.Titkova, M.Polivoda, A.Oettinger Shrinkage of Polypropylen Meshes after Implantation (experimental investigation) In: Actual problems of Herniology. Moscow 2002; 21-22. ed.Prof.A.Timoshin.
26. Schumpelick V, Klinge U, Klosterhalfen B (2002) Biomaterials for the repair of abdominal wall hernia: structural and composital considerations. In Nyhus and Condon's Hernia, fifth edition, edited by RJ Fitzgibbons jr. and A Gerson Greenburg. Lippincott Williams & Wilkins, Philadelphia ISBN: 0-7817-1962-3, pp 551-565
27. M. Stumpf, U. Klinge, R. Rosch, K. Junge, V. Schumpelick. Have we defeated the recurrence in the groin ? An epidemiological approach: Germany. In Meshes: Benefits and risks. Springer-Verlag 2004
28. Höer J, Lawong G, Junge K, Klinge U, Schumpelick V. Risk-factors predisposing for the development of incisional hernias. A retrospective analysis of 2983 cases over a period of 10 years. In Meshes: Benefits and risks. Springer-Verlag 2004
29. Karsten Junge, Uwe Klinge, Raphael Rosch, Michael Stumpf, Bernd Klosterhalfen, Volker Schumpelick. PVDF: a new alternative ? In Meshes: Benefits and risks. Springer-Verlag 2004
30. B. Klosterhalfen, Uwe Klinge, Raphael Rosch, Karsten Junge. Long-term Inertness of Meshes. In Meshes: Benefits and risks. Springer-Verlag 2004
31. R. Rosch, K. Junge, F. Hölzl, A. Schachtrupp, M. Stumpf, U. Klinge. How to construct a mesh? Impact of structure, filament and pore size for tissue ingrowth. In Meshes: Benefits and risks. Springer-Verlag 2004
32. Ch. Peiper, Karsten Junge, Uwe Klinge, Bernd Klosterhalfen, A. Öttinger, Volker Schumpelick. Does the Mesh Damage the Spermatic Cord? In Meshes: Benefits and risks. Springer-Verlag 2004
33. Bernd Klosterhalfen, Uwe Klinge, Karsten Junge, Raphael Rosch .Foreign-Body Carcinogenesis of Surgical Meshes. In Meshes: Benefits and risks. Springer-Verlag 2004
34. V. Schumpelick, U. Klinge, K. Junge, M. Stumpf, J. Conze, R. Rosch. Mesh Repair in the groin: for every hernia at all ages? In Meshes: Benefits and risks. Springer-Verlag 2004
35. M. Stumpf, A. Schachtrupp, U. Klinge, C.J. Krones, C. Toens, V. Schumpelick. Indications for mesh repair: Mesh repair for laparostomy – an underestimated procedure. In Meshes: Benefits and risks. Springer-Verlag 2004
36. V. Schumpelick, U. Klinge, M. Stumpf, F. Ulmer, K. Junge, R. Rosch. The ideal mesh - how should it look like? A surgical approach Open abdominal wall. In Meshes: Benefits and risks. Springer-Verlag 2004
37. Schumpelick V, Klinge U: Hals. In Kurzlehrbuch Chirurgie, Thieme-Verlag 2003, 6. Auflage, 346-367
38. Volker Schumpelick, Uwe Klinge, and Michael Stumpf: Treatment of Infections After Open Ventral Herniorrhaphy in Maximo Deysine: Hernia Infections Pathophysiology • Diagnosis • Treatment • Prevention (2004) Intellectual Property Management Marcel Dekker, Inc. 270 Madison Avenue New York, NY 10016 ISBN 0-8247-4612-0
39. Roland Fuchs et al (2005) GIT Tumore 2005. Roche
40. J. Conze, K. Junge, U. Klinge, C. Krones, R. Rosch, V. Schumpelick: Hernien. In Praxis der Viszeralchirurgie, Hrsg. Siewert, Rothmund, Schumpelick. Springer-Verlag, 2. Auflage 2006, S. 753-778. ISBN 3-540-29040-0
41. V Schumpelick, R Rosch, U Klinge, R Schwab, J Conze, K Junge. Tratamiento de hernias incisionales con es uso de implantes de malla. In Clinicas Quirurggicas de la Academia Mexicana de Cirurgia : Henrias de la pared abdominal. 2006 S. 173-189. ISBN 968 7827 75-0



42. R. Rosch, M. Binnebösel, K. Junge, P. Lynen-Jansen, P.R. Mertens, U. Klinge, V. Schumpelick  
The instable scar: biological reasons to fail. In Recurrent hernia – prevention and treatment.  
Hrsg. Schumpelick, Fitzgibbons, Springer Medizin Verlag Heidelberg (2007), 433 Seiten,  
ISBN 978-3-540-37545-6
43. Petra Lynen Jansen, MD; Uwe Klinge, MD; David H. Lovett, MD; Peter R. Mertens, MD  
Biomaterials: Disturbing factors in cell crosstalk and gene regulation. In Recurrent hernia –  
prevention and treatment. Hrsg. Schumpelick, Fitzgibbons, Springer Medizin Verlag Heidelberg  
(2007), 433 Seiten, ISBN 978-3-540-37545-6
44. M. Stumpf, U. Klinge, J. Conze, A. Prescher Hiatal Hernia – Anatomical limitations of surgical  
techniques. In Recurrent hernia – prevention and treatment. Hrsg. Schumpelick, Fitzgibbons,  
Springer Medizin Verlag Heidelberg (2007), 433 Seiten, ISBN 978-3-540-37545-6
45. Robert Schwab, Uwe Klinge, Oliver Schumacher, Marcel Binnebösel, Karsten Junge and  
Volker Schumpelick Biomechanical Data - “Herniamechanics”: Hernia size, Overlap and Mesh  
fixation. In Recurrent hernia – prevention and treatment. Hrsg. Schumpelick, Fitzgibbons,  
Springer Medizin Verlag Heidelberg (2007), 433 Seiten, ISBN 978-3-540-37545-6
46. Volker Schumpelick, Uwe Klinge, Raphael Rosch, Joachim Conze , Karsten Junge How to treat  
the recurrent incisional hernia: open repair in the midline. . In Recurrent hernia – prevention and  
treatment. Hrsg. Schumpelick, Fitzgibbons, Springer Medizin Verlag Heidelberg (2007), 433  
Seiten, ISBN 978-3-540-37545-6
47. J. Conze, M. Binnebösel, U. Klinge. How to treat the recurrent incisional hernia – Redo  
following mesh repair In Recurrent hernia – prevention and treatment. Hrsg. Schumpelick,  
Fitzgibbons, Springer Medizin Verlag Heidelberg (2007), 433 Seiten, ISBN 978-3-540-37545-6
48. Robert Schwab and Uwe Klinge To treat recurrent inguinal hernia: Principle actions for re-  
recurrences. In Recurrent hernia – prevention and treatment. Hrsg. Schumpelick, Fitzgibbons,  
Springer Medizin Verlag Heidelberg (2007), 433 Seiten, ISBN 978-3-540-37545-6
49. Peter R. Mertens, Petra Lynen-Jansen, Uwe Klinge. Identification of the patients at risk (for  
recurrent hernia disease). In Recurrent hernia – prevention and treatment. Hrsg. Schumpelick,  
Fitzgibbons, Springer Medizin Verlag Heidelberg (2007), 433 Seiten, ISBN 978-3-540-37545-6
50. K. Junge, R. Rosch, M. Anurov, S. Titkova, A. Öttinger, U. Klinge, V. Schumpelick.  
Pharmacological treatment of the hernia disease In Recurrent hernia – prevention and treatment.  
Hrsg. Schumpelick, Fitzgibbons, Springer Medizin Verlag Heidelberg (2007), 433 Seiten, ISBN  
978-3-540-37545-6
51. U. Klinge, A Fiebeler. Two controversial concepts: Standard procedure in a standard patient  
versus tailored surgery with procedures adjusted to individual patients? In Hernia Repair  
Sequelae. Hrsg V Schumpelick, RJ Fitzgibbons, Springer-Verlag Heidelberg (2009), 645 pages,  
ISBN 978-3-642-04552-3,
52. U. Klinge, A Fiebeler, M Tur. Postoperative CRPS in inguinal hernia patients. In Hernia Repair  
Sequelae. Hrsg V Schumpelick, RJ Fitzgibbons, Springer-Verlag Heidelberg (2009), 645 pages,  
ISBN 978-3-642-04552-3,
53. J Otto, U. Klinge *Concept of visible mesh and possibilities for analysis of mesh migration and  
shrinkage* In Hernia Repair Sequelae. Hrsg V Schumpelick, RJ Fitzgibbons, Springer-Verlag  
Heidelberg (2009), 645 pages, ISBN 978-3-642-04552-3,
- 54.



## Poster presentation

1. U. Klinge, B. Klosterhalfen, C. Mittermayer, V. Schumpelick (1995) Verwendung von Biomaterialien zum Bauchdeckenverschluß Poster für das 8th colloquium on biomaterials, 16.-17.2.1995
2. B. Klosterhalfen, U. Klinge, U. Henze, S. Hauptmann, Ch Mittermayer (1995) Zelluläre, biokompatibilitätsabhängige Antigenprofilexpression im Bereich der interaktiven Grenzfläche Biomaterial - Implantatlager. Poster für das 8th colloquium on biomaterials, 16.-17.2.1995
3. U. Klinge, B. Klosterhalfen, W. Limberg, A.P. Öttinger, V. Schumpelick (1995) Einsatz von Mesh-Materialien beim Narbenbruch - Veränderungen der Bauchwanddynamik nach Mesh-Implantation. 162. Tagung der Vereinigung niederrheinisch-westfälischer Chirurgen, 21.-23.9.1995, Oberhausen 1. Poster-Preis
4. U. Henze, B. Klein, U. Klinge, B. Klosterhalfen (1996) Heat shock protein 70 (HSP 70) and apoptosis in the interface of biomaterials used for abdominal wall replacement. Poster für das 9th colloquium on biomaterials, Febr. 1996
5. U.Klinge, J Conze, B Klosterhalfen, W Limberg, AP Öttinger, V Schumpelick (1996) Suitability of mesh material for hernia surgery. Poster für Joint Meeting des American College of Surgeons und der DGfC Berlin 9.-11.5.1996
6. U.Klinge (1997) Entwicklung und klinische Prüfung von oberflächenmodifizierten Biomaterialien zum Bauchdeckenverschluß. IZKF Biomat Mai 97
7. U. Klinge, B. Klosterhalfen, J. Conze, V. Schumpelick (1997) Bauchdeckenverschluß unter Verwendung von Biomaterialien. 85. Mittelrheinische Chirurgen-Kongreß in Tübingen, 11.-13.9.97 1. Posterpreis
8. V. Schumpelick, U. Klinge, B. Klosterhalfen, M. Müller (1998) Entwicklung und Prüfung von nicht-resorbierbaren Polyvinylidenfluorid-Meshes. IZKF Biomat 7/98
9. M. Müller, U Klinge, V Schumpelick (1998) Untersuchungen der Bauchwand –Mobilität mittels 3D-Stereographie. Niederrheinisch-westfälischer Chirurgenkongreß 24-26.9.1998
10. Welty, G., U. Klinge et al. (1999) 3d-Stereographie zur Erfassung der Bauchwandcompliance. Chirurgenkongreß, 1.-4.12.1999 München
11. Niewiera, M, U. Klinge, P Klever, E Spanke, V Krm, V. Schumpelick (1999) Möglichkeiten der Wundkontrolle mit Hilfe der quantitativen Videothermographie (Video TRM). Nordwestdeutscher Chirurgenkongreß 1.-4.12.1999
12. Stumpf, M, U Klinge, D Schubert, V Schumpelick (2000) Beurteilung der Bauchwandintegrität nach abdominalchirurgischen Eingriffen mittels 3D-Stereographie was bringt die Laparoskopie? 117. Kongreß der Deutschen Gesellschaft für Chirurgie 2.-6.5.2000, Berlin
13. Welty, G, M Stumpf, U Klinge, V Schumpelick (2000) Postoperative Komplikationen und Beschwerden nach Mesh-Implantation zur Hernienreparation. 117. Kongreß der Deutschen Gesellschaft für Chirurgie 2.-6.5.2000, Berlin
14. Fürstenberg, CH, U Klinge, G Welty, B Klosterhalfen, V Schumpelick (2000) Explantation eines Marlex-Mesh wegen erheblicher funktioneller Einschränkung der Bauchwandbeweglichkeit. 117. Kongreß der Deutschen Gesellschaft für Chirurgie 2.-6.5.2000, Berlin
15. Töns, Ch, A Marx, U Klinge, V Schumpelick (2000) Reintervention nach meshaugmentierten Hernienreparationen der Bauchwand. 117. Kongreß der Deutschen Gesellschaft für Chirurgie 2.-6.5.2000, Berlin
16. Peiper Ch, Klosterhalfen B, Junge K, Bühner A, Klinge U Schumpelick V (2000) Preperitoneal polypropylene mesh in the inguinal region causes major inflammatory changes of the spermatic cord in the pig. AHS und EHS: Hernia in the 21th century, Toronto 15-18.6.2000
17. Welty G, Klinge U, Stumpf M, Klosterhalfen B, Schumpelick V (2000) Experiences with new developed mesh materials for incisional hernia repair. AHS und EHS: Hernia in the 21th century, Toronto 15-18.6.2000

18. Niewiera, M., Klinge, U., Phillips, B., Schumpelick, V.(2000) Ist eine Hilfestellung bei der Wundkontrolle durch die quantitative Videothermografie (video TRM) möglich? 167. Tagung der Vereinigung niederrheinisch-westfälischer Chirurgen, 28.-30.9.2000
19. Conze, J., Klinge, U., Klosterhalfen, B., Schumpelick, V.(2000) Adhäsionsinduktion durch Netze. 167. Tagung der Vereinigung niederrheinisch-westfälischer Chirurgen, 28.-30.9.2000
20. Höer, J., Klinge, U., Töns, CH., Schumpelick, V. (2000) Einfluß von Nahtmaterial und Nahttechnik auf die Qualität der Wundheilung beim Laparotomieverschluß. Ergebnisse einer experimentellen Studie. 167. Tagung der Vereinigung niederrheinisch-westfälischer Chirurgen, 28.-30.9.2000
21. U Klinge (2001) Kollagen und MMP's bei Bauchwandhernien. DFG-Workshop, 7.-9. März 2001, Bielefeld
22. Höer J, Lawong AG, Klinge U, Schumpelick V: Narbenhernieninzidenz an einer chirurgischen Universitätsklinik. Retrospektive Analyse der Einflußfaktoren an 2983 Patienten. 118 Kongreß der DGfC München 1.-5.5.2001
23. Peiper C, Klosterhalfen B, Junge K, Bühner A, Klinge U, Schumpelick V: Der Einfluß des inguinalen Polypropylen-Mesh auf die Strukturen des Samenstrangs im Tierversuch. 118 Kongreß der DGfC München 1.-5.5.2001
24. Junge K, Klinge U, Klosterhalfen B, Bialasinski L, Schumpelick V (2001) Influence of textile structure of surgical meshes on tissue ingrowth in a rat model 1<sup>st</sup> biennial meeting of the European Tissue Engineering Society ETES, Freiburg 7-10.11.2001
25. Junge K, Klinge U, Klosterhalfen B, Lynen P, Bialasinski L, Schumpelick V (2002) Influence of textile structure of biomaterials on foreign body reaction and scar formation in a rat model. 15 Aachener Colloquium on Biomaterials 27.2-1.3.2002, Aachen
26. Stumpf M, Klinge U, Junge K, Klosterhalfen B, Schumpelick V (2002) Analyse des Kollagenstoffwechsels bei Patienten mit Anastomoseninsuffizienzen in Folge kolorektaler Resektionen. 119. Kongress der DGfC, Berlin 7.-11.5.2002
27. Höer J, Klinge U, Junge K, Anurov M, Öttinger A, Schumpelick V (2002) Qualität der Laparotomieheilung: Einfluß von Faden/Wundlängenverhältnis, Nahttechnik und Nahtspannung auf die Kollagensynthese im Inzisionsbereich. 119. Kongress der DGfC, Berlin 7.-11.5.2002
28. Steinau G, Klinge U, Schumpelick V (2002) Vollresorbierbares Material als Zwerchfellersatz – eine tierexperimentelle Untersuchung. 119. Kongress der DGfC, Berlin 7.-11.5.2002
29. Ophoff K, Junge K, Klinge U, Schumpelick V (2002) Einfluß von präoperativer Zinkapplikation auf die Anastomosenheilung unter septischen Bedingungen in der Ratte. 119. Kongress der DGfC, Berlin 7.-11.5.2002
30. Junge K, Klinge U, Schumpelick V (2002) Einfluss alloplastischer Materialien auf Quantität und Qualität der Kollagenbildung im Nagermodell. Symposium „Nahttechniken in der Chirurgie 29.8-31.8.2002, 1. Posterpreis
31. Rosch R, Junge K, Schachtruipp A, Klinge U, Klosterhalfen B, Schumpelick V Kurz- und langfristige Unterschiede in der Entzündungsreaktion nach Implantation verschiedener Netzmaterial im Kleintiermodell. 120. Jahrestagung der DGfC, München 29.4-2.5.2003
32. Rosch R, Junge K, Ulmer F, Höer J, Klinge U, Schumpelick V Kollagen-interagierende Proteine bei Patienten mit Narbenhernien. 120. Jahrestagung der DGfC, München 29.4-2.5.2003
33. Rosch R, K Junge, A Schachtrupp, U Klinge, B Klosterhalfen, V Schumpelick (2003) Materialabhängige Zellantwort nach Netzimplantation in der Ratte. Hernienchirurgie, Koblenz, 13-14.6.2003-06-16
34. R. Schwab (1,2), O. Schumacher (1), K. Junge (1), U. Börner (3), U. Klinge (1), H.P. Becker (2), V. Schumpelick (1) Fixierung von Meshes in der Hernienchirurgie: Wann müssen welche Meshes fixiert werden? DGfC München, 6.4.2005

35. P. Lynen Jansen (1), U. Klinge (1), M. Rezvani (1), M. Jansen (1), P. R. Mertens (2). Trans- und cis-regulatorische Elemente beeinflussen den gestörten Kollagenmetabolismus primärer Fibroblasten von Narbenhernienpatienten in vitro. DGfC München, 6.4.2005
36. R. Rosch (1), U. Klinge (1), K. Junge (1), C.J. Krones (1), P.R. Mertens (2) Die Karzinomerkkrankung: Eine prädisponierende Pathologie der Extrazellulärmatrix ? DGfC München, 8.4.2005
- 37.
38. U Klinge, S Theuer, A Fiebler: Inactivation of the MR reduces extent of fibrotic foreign body reaction around surgical sutures. 34th Adosterone Conference 13.-14.6.2008 San Francisco, USA
39. no longer actualised .....

## awards

1. Töns, Klosterhalfen, Klinge, Schumpelick: Septischer Schock und multiples Organversagen in der chirurgischen Intensivmedizin. Ein tierexperimentelles Modell zur Analyse pulmonaler und intestinaler Dysfunktion. Preis der Deutsche Gesellschaft für Chirurgie für Intensivmedizin (1992)
2. U. Klinge, B. Klosterhalfen, W. Limberg, A.P. Öttinger, V. Schumpelick (1995) Einsatz von Mesh-Materialien beim Narbenbruch - Veränderungen der Bauchwanddynamik nach Mesh-Implantation. 162. Tagung der Vereinigung niederrheinisch-westfälischer Chirurgen, 21.-23.9.1995, Oberhausen, 1. Poster-Preis
3. U. Klinge, B. Klosterhalfen, J. Conze, V. Schumpelick (1997) Bauchdeckenverschluß unter Verwendung von Biomaterialien. 85. Mittel-rheinische Chirurgen-Kongreß in Tübingen, 11.-13.9.97, 1. Posterpreis
4. Schumpelick, V, Arlt G, Klinge U, Schippers E (1997) Pathophysiologische Untersuchungen zu neuen Methoden in der Abdominal-Chirurgie. Ehrenurkunde der Staatlich-Russischen Medizinischen Universität Moskau
5. Junge K, Klinge U, Schumpelick V (2002) Einfluss alloplastischer Materialien auf Quantität und Qualität der Kollagenbildung im Nagermodell. Symposium „Nahttechniken in der Chirurgie 29.8-31.8.2002, 1. Posterpreis
6. P Lynen-Jansen, Klinge U, Hungol M, Krott E, Lovett D, Jansen M, Mertens PR (2006) "Response Element 1 reguliert die Expression der MMP-2 in der Wundheilung: Ergebnisse aus dem transgenen Tiermodell" Fritz Linder Forumspreis der DGfC 5.5.2006, Berlin
7. Junge K, Klinge U, Rosch R, Schwab R, Conze J, Schumpelick V (2006) Preis für den besten wissenschaftlichen Kurzvortrag, 4. Jahrestagung der Deutschen Herniengesellschaft 26.-27.5.2006, Hannover
8. Junge K, Klinge U, Rosch R, Lynen P, Binnebosel M, Conze J, Mertens PR, Schwab R, Schumpelick V. Franz-Caspar-Hesselbach-Preis für die beste wissenschaftliche Publikation: Improved collagen type I/III ratio at the interface of gentamicin-supplemented polyvinylidenfluoride mesh materials. in Langenbecks Arch Surg. 2007 Aug;392(4):465-71, 5. Jahrestagung der Deutschen Herniengesellschaft 26.-15.-16.6.2007, Berlin
9. Klinge U, Otto J, Krämer N, Obolenski B: Sichtbarmachung von textilen Implantaten im MRT durch Einlagerung von superparamagnetischen Eisenoxid-Nanopartikeln. Innovationswettbewerb 2007 des BmbF zur Förderung der Medizintechnik, 18.10.2007
10. J. Otto, N Krämer, GA Krombach, M Hodenius, I Slabu, M Baumann, U Klinge: The MR-visible Mesh – first in-vivo analysis of mesh shrinkage in a rat model. Chevrel Award for best Poster, 4th international hernia congress, 9.-12th Sept 2009, Berlin
- 11.

## Video presentations

1. Kasperk, R, U Klinge, V Schumpelick (2000) Reparation großer Narbenhernien mittels nicht resorbierbarer Netze in Sublay-Technik. 117. Kongreß der Deutschen Gesellschaft für Chirurgie 2.-6.5.2000, Berlin
1. Kasperk R, Klinge U, Stumpf M, riesener KP, Schumpelick V (2001) New technique for the repair of a parastomal hernia. 23. International congress of the EHS, Milano 21-23.6.2001
- 2.

## Oral presentations:

2. U.Klinge Diagnostik der Leistenhernie. Leistenhernien-Workshop 1986,1986,1987,1988,1989,1990,1991,1992,1993
3. U.Klinge Pathogenese der Stress-Läsion. Gastro-enterologisches Kolloquium 4/1986 in Aachen
4. SCHUMPELICK V., FAß J., KLINGE U., EFFENDY W. Das Risiko in der Magen Chirurgie Vortrag auf dem 11. Symposium Aktuelle Chirurgie in Berlin 1986
5. NACHTKAMP J., BARES R., WINKELTAU G., KLINGE U., SCHUMPELICK V.: Gastro-bronchialer Reflux unter Streßulcusprophylaxe: Ursache von bronchio-pulmonalen Infektionen bei Beatmungspatienten? Tagung der Österreichischen Gesellschaft für Chirurgie Innsbruck, 2. - 4. Juni 1988
6. NACHTKAMP,J.,BARES, R., WINKELTAU, G., KLINGE,U., SCHUMPELICK,V., BÜLL,U., LERCH,M.M.: Keimbeseidlung des Magens unter medikamentöser Streßulcusprophylaxe – Ursache von broncho-pulmonalen Infektionen bei Beatmungspatienten Tagung der Deutschen Gesellschaft für Verdauungs- und Stoffwechselkrankheiten Heidelberg, 21. - 24. September 1988
7. NACHTKAMP,J., BARES,R., WINKELTAU,G., KLINGE,U., LERCH, , SCHUMPELICK,V.: Gastrobronchialer Reflux, Ursache von nosokomialen Pneumonien unter Streßulcusprophylaxe? Kongreß der Deutschen Gesellschaft für Chirurgie, München, 29.03.-01.04.1989
8. U Klinge, D.Kupczyk-Joeres, K.Boden, V.Schumpelick Erweitertes prospektives Monitoring bei Patienten nach Magentransposition auf einer chirurgischen Intensivstation. CASS-Tagung 1987 in Heidelberg
9. U.Klinge, D.Kupczyk-Joeres, V.Schumpelick Neue Aspekte bei der Überwachung beatmeter Patienten. Arbeitsgemeinschaft für Intensivmedizin der DGfC 5.+ 6.2.1988 in München
10. U.Klinge Die innere Hernie. Leistenhernien-Workshop 1988
11. U.Klinge Die Epidemiologie der Ulkus-Krankheit. Magen-Workshop 1988, 1989, 1990
12. U.Klinge Anale Manifestation des M. Crohn. Kolon-Workshop 1988
13. U.Klinge Klinik und Komplikationen der Sigmadivertikulitis. Kolon-Workshop 1989, 1990, 1991
14. Nachtkamp, R. Bares, G. Winkeltau, U. Klinge, M.M. Lerch, V. Schumpelick, U. Büll Gastrobronchialer Reflux, Ursache von nosokomialen Pneumonien unter Streßulcusprophylaxe. 106. Kongreß der DGfChir, München; 6.-10.3.1989
15. Ch. Töns, G. Alzen, J. Braun, U. Klinge, V. Schumpelick Zur Wertigkeit des Defäkogramms bei der Diagnostik der anorektalen Inkontinenz. CAP-Arbeitsgemeinschaft für Proktologie in der DGfChir, Giessen; 18.2.1989
16. U.Klinge, G.Steinau, V.Schumpelick, G.Alzen The Common Channel Syndrome - a rare cause of hyperamylasemia in childhood. Grenzlandsymposium März 1990
17. Steinau,G., Klinge, U., Tittel,A., Skopnik, H.,Schumpelick,V.: Cholelithiasis in childhood. 9. Grenzland-Symposium - Biliary Surgery,Aachen, 08.-10.03.1990
18. TÖNS,CH., KLINGE,U., TITTEL,A., SCHUMPELICK,V.: Regime zentrale Venenkatheter auf chirurgischen Intensivstationen. 157. Tagung Vereinigung Niederrheinisch-Westfälischer Chirurgen, Düsseldorf, 27.-29.09.1990
19. TÖNS,Ch., KLINGE,U., SCHUMPELICK,V.: Die akute Pankreatitis in der chirurgischen Intensivmedizin - Ergebnisverbesserung unter modifiziertem Monitoring und Therapiekonzept. 2. Deutscher Interdisziplinärer Kongreß für Intensivmedizin. Hamburg, 24.-27.11.1993.
20. TÖNS,Ch., KLINGE,U., KIRDORF,H., SCHUMPELICK,V.: Das postoperative akute Nierenversagen auf der chirurgischen Intensivstation - Management und Verfahrenswahl. 108. Tagung der Deutschen Gesellschaft für Chirurgie, München, 16.-20.04.1991
21. U.Klinge, Partieller Bauchwandersatz im Experiment Ethicon-Kongreß Hamburg "Chirurgie der Faszien" 8.5.91
22. U.Klinge, Epidemiologie und Pathogenese der Cholelithiasis Leber-,Galle-,Pankreasworkshop 1991, 1992, 1993



23. U.Klinge, Postoperative intensivmedizinische Behandlung der Pankreatitis Leber-,Galle-, Pankreasworkshop 1991, 1992, 1993
24. U.Klinge Epidemiologie und Pathogenese des kolorektalen Karzinoms Kolon-Workshop 1982
25. U.Klinge Geschichte der Hernienchirurgie Hernienworkshop 1994
26. U.Klinge Langzeitbeatmung und Entwöhnung Intensiv-Workshop 1994
27. U.Klinge Venöse und arterielle Katheter Intensiv-Workshop 1994
28. U.Klinge Review of literature and experimental results of mesh surgery Expert-Meeting Suffretta-House St. Moritz Feb. 1994
29. U.Klinge Verwendung von Biomaterialien beim Bauchdeckenverschluß Gesundheit 2000: Biomaterialien und Material-Gewebsinteraktion bei Implantaten, 8.6.1994, AGIT
30. U.Klinge Transanale Resektionen Kolo-Rektum-Workshop 1994, 1996, 1999
31. U.Klinge Operative Therapie beim unkomplizierten Ulkus - Indikation Workshop Magen, November 1994
32. Conze, J., U. Klinge, V. Schumpelick Ergebnisse der Narbenhernien-Reparation an der RWTH Aachen von 1987-1995 162. Tagung der Vereinigung niederrheinisch-westfälischer Chirurgen, 1.-23.9.1995, Oberhausen
33. U.Klinge Experimentelle Biologie der Netzplastik Hernien Workshop 9.-11.5.1996, 22.-24.5.97, 10-12.9.1998
34. U.Klinge Pathophysiologie der Narbenhernie Chirurgentag Nürnberg 24.10.1996
35. Henze, U., M Kaufmann, U Klinge, R. Bhardwaj, B Klosterhalfen Detection of HSP 70 in endothelial cells for screening cytotoxicity. 13.2.97 10th colloquium on biomaterials, Aachen
36. U.Klinge Palliativchirurgie beim Malignom des Pankreas 1. Workshop Viszeralchirurgie 1997
37. U.Klinge Verwendung von Biomaterialien zum Bauchdeckenverschluß 13.3.97 Schwerpunkttreffen II Biomat
38. Conze, J., U Klinge (1998) Biocompatibility of biomaterials – clinical and mechanical aspects. II Suvretta meeting: abdominal wall: function, defects and repair. 8.-14.3.1998 St. Moritz Swiss
39. U. Klinge, B Klosterhalfen (1998) Biocompatibility of biomaterials – experimental aspects. II Suvretta meeting: abdominal wall: function, defects and repair. 8.-14.3.1998 St. Moritz Swiss
40. B. Klosterhalfen, U. Klinge (1998) Biocompatibility of biomaterials – histological aspects. II Suvretta meeting: abdominal wall: function, defects and repair. 8.-14.3.1998 St. Moritz Swiss
41. U. Klinge, M. Müller, V. Schumpelick (1998) Experimental and clinical results with a new polypropylene reduced mesh. 20<sup>th</sup> Eur Hernia Soc GREPA 18.-20.6.98 Köln
42. U. Klinge (1998) Meshes in der Chirurgie. Hernienworkshop 10.9-12.9.1998
43. U. Klinge (1998) Biomaterialien. Chirurgische Aspekte. Hernienworkshop 10.9-12.9.1998
44. U. Klinge (1998) Der Einsatz von Meshes bei der Reparatoren von Bauchwandhernien. Medizinische Gesellschaft der RWTH Aachen 13.10.1998
45. U. Klinge (1998) Meshes zur Hernienreparation. 7. Interdisziplinäres Forum der Förderung operativer medizinisch-wissenschaftlicher Fachgesellschaften 17.10.1998 Wiesbaden
46. U. Klinge (1998) Chirurgischer Notfall: Akute Cholecystitis. 2. Workshop Chirurgische Notfall- und Intensivmedizin 22.-24.10.1998, 3. Workshop 11-13.11.99
47. U. Klinge (1999) Meshes in der Hernienchirurgie. Techtextil Symposium 15.4.1999, Frankfurt
48. U. Klinge (1999) Chirurgie der Narbenhernie. 5. Kölner Tagung ambulantes Operieren. Köln, 7.5.1999
49. U. Klinge (1999) Ergebnisse der Narbenhernienreparation der chir. Klinik Aachen. Narbenhernienkongreß 17-18.9.99
50. U. Klinge (1999) Pathophysiologie der Bauchdecke. Weißenseer Operationskurs 24.9.99
51. U. Klinge (1999) Rezidive und Patientenkomfort im Langzeitverlauf. Weißenseer Operationskurs 24.9.99
52. U. Klinge, B Klosterhalfen, V Schumpelick: Alteration of collagen metabolism in hernia patients and consequences for the therapeutic approach. 21. International Congress of the European Hernia Society 3-6.11.99, Madrid



53. Niewiera, M, U Klinge, P Klever, V Kram, E Spanke, V Schumpelick: Fallbericht über den Einsatz der quantitativen Videothermographie (video TRM) in der Routinediagnostik der Appendizitis. Niederrheinisch-Westfälischer Chirurgenkongreß 28.-30.10.99
54. U. Klinge (7.12.99) Meshes in der Hernienchirurgie. 5. Zürser Hernienforum, Zürs, Austria
55. U. Klinge (9.3.2000) Narbenhernienchirurgie: Primärverschluß oder Netzimplantat? Interdisziplinäre Viszeralchirurgie am Inselspital, Bern, Schweiz
56. U.Klinge (15.3.2000) Die Hernie eine genetische Kollagenkrankheit? Universität Bonn, Institut für med. Statistik
57. U. Klinge (31.3.2000) TV 41/42 Klausurtagung Biomat
58. U. Klinge (3.5.2000) Biomaterialien in der Hernienchirurgie. FomwF, 117. Kongreß der Deutschen Gesellschaft für Chirurgie 2.-6.5.2000, Berlin
59. U. Klinge (4.5.2000) Epidemiologie und Pathophysiologie der Bauchwanddefekte. Narbenhernie, 117. Kongreß der Deutschen Gesellschaft für Chirurgie 2.-6.5.2000, Berlin
60. U. Klinge (26.5.2000) Anatomy and physiology of the abdominal wall. Laparoscopic incisional hernia repair a standard therapy? Rastatt, 25.5-27.5.2000
61. U. Klinge (2.6.2000) Technical aspects, abdominal wall physiology, integration and inflammatory reaction. 35. ESSR-Kongreß, Malmö, 1.-3.6.2000
62. U. Klinge (2.6.2000) News and future outlooks. 35. ESSR-Kongreß, Malmö, 1.-3.6.2000
63. Stumpf M, Klinge U, Welty G, Schumpelick V (2000) The surgical trauma of abdominal wall incision – measurements with three-dimensional stereography. AHS und EHS: Hernia in the 21th century, Toronto 15-18.6.2000
64. U. Klinge (2000) Pathophysiologie der Bauchdecke. Weißenseer Operationskurs 2000, 8.9.2000, Berlin
65. U. Klinge (2000) Rezidive und Patientenkomfort im Langzeitverlauf. Weißenseer Operationskurs 2000, 8.9.2000, Berlin
66. U. Klinge (2000) Netzimplantate in der Hernienchirurgie – Charakteristika und Anforderungen. Netzimplantate 22.-23.9.2000, Würzburg
67. U. Klinge (2000) Minimierte Polypropylen-Netze zur präperitonealen Netzplastik – prospektive Studie. 22.-23.9.2000, Würzburg
68. U. Klinge (2000) Implantierbare Netze in der Chirurgie – Nutzen oder Risiko? Fortbildungsveranstaltung der Kreisstelle Mülheim/Ruhr 10.10.2000, Evang. Krankenhaus Mülheim a. d. Ruhr
69. Stumpf, M, U. Klinge, C. Wei, B. Klosterhalfen, V. Schumpelick (2000) Störung des Kollagenstoffwechsels bei Patienten mit Wundheilungsstörungen nach kolorektalen Anastomosen. Gründungskongress der Arbeitsgemeinschaft Wundheilung der DGfC, 13-14.10.2000 Tübingen
70. U. Klinge, B. Klosterhalfen, V. Schumpelick (2000) Kollagenstoffwechselstörungen und Konsequenzen für die chirurgische Therapie. Gründungskongress der Arbeitsgemeinschaft Wundheilung der DGfC, 13-14.10.2000 Tübingen
71. V. Schumpelick, U. Klinge (2000) Entwicklung eines neuartigen Hernien-Meshes im Rahmen des IZKF-Biomat. ZiTEx-Forum "Technische Textilien im Medizin/Hygiene-Bereich, 16.10.2000, EXPO 2000
72. U. Klinge (2000) Offene Mesh-augmentierte Reparatursverfahren der Leistenhernie. 12. Wuppertaler Workshop für laparoskopische Operationen, 16.-17.11.2000, Wuppertal
73. U. Klinge (2001) Kunststoffe in der Hernienchirurgie: Gefahr oder Fortschritt? Antrittsvorlesung 17.1.2001, Aachen
74. U.Klinge (2001) Textile Netzstrukturen in der Chirurgie. Klausurtagung IZKF BIOMAT 16.3.2001 Aachen
75. U. Klinge (2001) Netzimplantate in der Hernienchirurgie: Charakteristika und Anforderungen. Implantate in der Hernienchirurgie – Quo vadis? 2.-4.4.2001, European Surgical Institute, Norderstedt

76. Niewiera MC, Klinge U, Wosniezka M, Lörken M, Schumpelick V: Ist eine Hilfestellung bei der Wundkontrolle durch die quantitative Vioedeothermografie (Video TRM) möglich? 118 Kongreß der DGfC München 1.-5.5.2001
77. Conze J, Müller S, Klosterhalfen B, Klinge U, Schumpelick V: Polypropylen in der intraabdominellen Position – Einfluss der Porengröße auf die Gewebereaktion im Kaninchenmodell. 118 Kongreß der DGfC München 1.-5.5.2001
78. Stumpf M, Klinge U, Tittel A, Dreuw B, Schumpelick V: Einfluß der Laparoskopie auf die Bauchwandintegrität nach abdominalchirurgischen Eingriffen. MIC-Club-West 7. Treffen, Wuppertal 18.5.2001
79. Schumpelick V, Peiper C, Klinge U (2001) How to approach an inguinal recurrence. 23. International congress of the EHS, Milano 21-23.6.2001
80. Schumpelick V, Stumpf M, Klinge U (2001) Evidence based surgery for hernia repair. 23. International congress of the EHS, Milano 21-23.6.2001
81. Höer J, Junge K, Klinge U, Töns C, Schumpelick V (2001) Influence of suture material and suture technique on the fascial wound healing in rats. 23. International congress of the EHS, Milano 21-23.6.2001
82. Junge C, Peiper C, Klinge U, Schumpelick V (2001) Elasticity of the abdominal wall in comparison to surgical meshes. 23. International congress of the EHS, Milano 21-23.6.2001
83. Klinge U, Junge K, Klosterhalfen B, Schumpelick V (2001) Functional and histological investigation of a novel low weight mesh of polypropylene monofilaments in a rat model. 23. International congress of the EHS, Milano 21-23.6.2001
84. Peiper C, Klosterhalfen B, Junge K, Bühner A, Klinge U, Schumpelick V (2001) The reaction of the structures of the spermatic cord on a preperitoneal polypropylene mesh in the pig. 23. International congress of the EHS, Milano 21-23.6.2001
85. Klosterhalfen B, Klinge U, Canino V (2001) Complications of surgical meshes – results of the first post implantation retrieval study. 23. International congress of the EHS, Milano 21-23.6.2001
86. Kasperk R, Klinge U, Stumpf M, Riesener KP, Schumpelick V (2001) New technique for the repair of a parastomal hernia. 23. International congress of the EHS, Milano 21-23.6.2001
87. Klinge, U (2001) Konsequenzen der Netzgeometrie für die Zell- und Gewebsreaktion. 1. MPG-IZKF-Symposium, 18.-19.9.2001, Ulm
88. Klinge, U (2001) Rezidivoperationen und Biomaterial. 1668. Jahrestagung der Vereinigung Niederrheinsich-Westfälischer Chirurgen, 27.-29.9.2001 Bielefeld
89. Klinge, U (2001) Rezidive und Patientenkomfort im Langzeitverlauf. 3. Weißenseer Operationskurs 28.-29.9.2001, Berlin
90. Klinge, U (2001) Welcher Patient bekommt ein Leistenhernienrezidiv? Aktuelles aus der Forschung. Chirurgie Aachen Workshop “Viszeralchirurgie”, 24-26.10.2001
91. Junge K, Klinge U, Klosterhalfen B, Bialasinski L, Schumpelick V (2001) Influence of textile structure of surgical meshes on tissue ingrowth in a rat model. 1<sup>st</sup> Biennial meeting of the ETES, Freiburg 7-10.11.2001, in tissue engeneering 2001, 7: 638
92. Junge K, Klinge U, Peltrosche-Llacsahuanga, Kloserhalfen B, Kunz D, Schumpelick V (2002) Infection prophylaxis by gentamycin supplementation of polyvinylidenfluoride mesh materials for abdominal wall repair. Arbeitstagung der CAB Berlin 18/19.1.2002, in EJ Traum
93. Klinge U (2002) Epidemiologie, Patholgoie und sozioökonomische Bedeutung der Narbenhernie. Baden-Baden 21-23.2.2002: Symposium Laparoskopische und konventionelle Narbenhernienreparation. Konkurrierende oder ergänzende Verfahren?
94. Klinge U (2002) Shouldice Methode der Wahl? Symposium 20.4.2002, European Surgical Institute, Norderstedt
95. Klinge U (2002) Pathophysiological concept for hernia repair. ESSR Congress Szeged, 23.-25.5.2002

96. Niewiera M, Klinge U, Junge K, Ulmer F, Schumpelick V (2002) Möglichkeiten der Wundkontrolle mit Hilfe der quantitativen Videothermographie (VideoTRM). 119. Kongress der DGfC, Berlin 7.-11.5.2002
97. Schachtrupp A, Klinge U, Bhardwaj R, Rosch R, Schumpelick V (2002) Individueller Response humaner Makrophagen auf Netzmaterialien in der Zellkultur. 119. Kongress der DGfC, Berlin 7.-11.5.2002
98. Kasperk R, Stumpf M, Klinge U (2002) Anastomosenhilung – Alternativen zur Naht? 119. Kongress der DGfC, Berlin 7.-11.5.2002
99. U. Klinge (2002) Der Shouldice. 18. Krefelder Chirurgen-Symposium, 12.6.2002, Krefeld
100. Klinge U (2002) Die parastomale Hernie – seine Ursachen und Möglichkeiten der Therapie. ILCO Aachen, 26.8.2002, Aachen
101. Klinge, U (2002) Impact of mesh material on clinical results. III Spotkanie Polskiego Klubu Przepuklinowego 20.-21.9.2002, Bydgoszcz, Poland
102. Klinge U (2002) Epidemiologie und Pathogenese der Narbenhernie sowie Ansätze zu deren Reparation. 2. Österreichischer Chirurgenstag, Baden, 22.-23.11.02
103. KLINGE,U., SCHUMPELICK,V.:OP nach Shouldice Magdeburger MIC-Symposium „Hernienchirurgie“Magdeburg, 28. – 30. November 2002
104. KLINGE, U., K. JUNGE Pathophysiological concept for mesh repair. In: Proceedings of the 37th Congress of the European Society for Surgical Research, M. Boros Editor. Monduzzi Editore S.p.A., Bologna, Italy, 2002, pp. 55-62, ISBN 88-323-2524-1
105. Klinge U (2003) How to construct a mesh? III. Suvretta meeting 14.-18.1.2003-01-22
106. Junge K, Klinge U, Schachtrupp A, Rosch R, Schumpelick V Versorgung eines großflächigen Bauchwanddefektes mit einem Kunststoffnetz. 120. Jahrestagung der DGfC, München 29.4-2.5.2003
107. Junge K, Lynen P, Rosch R, Klinge U, Töns C, Schumpelick V Defekte Fibroblasten als Ursache rezidivierender Narbenhernien. 120. Jahrestagung der DGfC, München 29.4-2.5.2003
108. Junge K, Klinge U, Rosch R, Klosterhalfen B, Krott E, Stumpf M, Schumpelick V PVDF – ein alternatives Polymer ohne Fremdkörperreaktion? 120. Jahrestagung der DGfC, München 29.4-2.5.2003
109. Steina G, Klinge U, Schumpelick V Zwerchfellersatz mit vollresorbierbarem Material – eine tierexperimentelle Studie. 120. Jahrestagung der DGfC, München 29.4-2.5.2003
110. Stumpf M, Klinge U, Willms A, Zabrocki R, Schumpelick V Analyse des Kollagenstoffwechsels bei Patienten mit kolorektalen Anastomosen – eine prospektive klinische Studie. 120. Jahrestagung der DGfC, München 29.4-2.5.2003
111. Junge K, Rosch R, Kirsch J, Klinge U, Schumpelick v (2003) Kollagen – maßgeblicher Faktor in der Pathogenese von Rezidivhernien nach Mesh-Implantation? Hernienchirurgie, Koblenz, 13-14.6.2003
112. Klinge U (2003) Standardoperationen in der chirurgischen Onkologie von gastrointestinalen Tumoren. 10. Workshop Gastrointestinale Tumore, Köln, 14-15.6.2003
113. Schumpelick V, Klinge U: Seromas, infected or exposed mesh in incisional hernia. 2<sup>nd</sup> international hernia congress, London, 19-21.6.2003
114. Klinge U (2003) Mesh materials: tissue response and tissue engineering. ESAO 3.9-6.9.2003, Aachen
115. Klinge U (2003) Pathologie und therapeutische Bedeutung der Mesh-Implantation. 4. Aachener Workshop Viszeralchirurgie 17.-19.9.2003
116. Klinge U (2003) Operative Therapie des Pankreaskarzinoms: Technik und Grenzen. 4. Aachener Workshop Viszeralchirurgie 17.-19.9.2003
117. Klinge U (2004) Laparoskopische Narbenhernienreparation – Contra. Mic-Club West, 2. 4. 2004, Aachen

118. Klinge U (2004) Spätfolgen und –ergebnisse nach Netzimplantation in der Bauchdecke. 10. 10. Kölner Tagung des BDC „Ambulante Chirurgie in Klinik und Praxis“, 14.-15.5.2004, Köln, Crowne Plaza Hotel
119. Klinge, Uwe (2004) Incisional hernia: Laparoscopic versus open – open. 12th international Congress of the European Association for endoscopic surgery, 9-12.6.2004, Barcelona
120. Klinge, Uwe (2004) Vorteile der konventionellen Hernienchirurgie. Marburg, 30.6.2004
121. Klinge, Uwe (2004) Das Netz als Gewebeersatz. 2. Mitteldeutscher Chirurgenkongress, Leipzig 23.-25.9.2004-09-27
122. Klinge U (2004) Pathophysiology and therapeutic impact of meshes. Utrecht 13.9.2004
123. Klinge U (2004) Biomaterials for Hernia repair. Utrecht 13.9.2004
124. Klinge U (2004) Chirurgische Onkologie – Aktuelle Standortbestimmung. Workshop Praktische Onkologie, Bonn 23.-24.10.2004
125. Klinge U (2004) Standardoperationen – unterer GI-Trakt. Workshop Praktische Onkologie, Bonn 23.-24.10.2004
126. Klinge U (2004) Standardoperationen – oberer GI-Trakt. Workshop Praktische Onkologie, Bonn 23.-24.10.2004
127. Klinge U (2004) Novel textile structures in medicine. 31th Aachen Textile conference, 24.-25.11.2004, Aachen, Eurogress
128. Klinge U (2004) Arbeitsgruppe „mesh“: textile Netze zur Therapie von Bauchwandhernien. Phillips Forschungslaboratorium, 9.12.2004, Aachen
129. P. Lynen Jansen (1), M. Jansen (1), M. Hungol (1), E. Krott (1), P. R. Mertens (2), U. Klinge (1) Alloplastische Netzbiomaterialien induzieren die MMP-2 Promotoraktivität. Ergebnisse aus dem transgenen Mausmodell. DGfC 5.4.2005
130. J. Höer (1), D. Güler (2), U. Klinge (2), C. Töns (1), V. Schumpelick (2). Einfluß mittel- und langfristig resorbierbarer Nahtmaterialien auf die Narbenhernieninzidenz und Wundheilungsstörungen nach Laparotomieverschluß. Ergebnisse einer prospektiv-randomisierten, kontrollierten Studie. DGfC 5.4.2005
131. Klinge U (2.1.2005) Complications in open incisional hernia, London
132. Klinge (2.1.2005) Evidence based open IH, London
133. Klinge, U (2005) Nabel-, Narbenhernie. BDC-Seminar, Kassel, 14.-18.2.2005
134. Klinge, U (2005) Open-Non-Mesh: Shouldice – the good old way. 16.2.2005 Leistenhernienchirurgie 2005, Bethlehem-Krankenhaus, Stolberg
135. Klinge U (2005) Alloplastische Implantate und Gewebereaktion. Luzern 22.9.2005 1. gemeinsame Fortbildung der Vereinigung der Gynäkologen Luzern/Zentralschweiz
136. Klinge U (2005) Standardoperationen – unterer GI-Trakt. Workshop Praktische Onkologie, Bonn 14.-16.10.2005
137. Klinge U (2005) Standardoperationen – oberer GI-Trakt. Workshop Praktische Onkologie, Bonn 14.-16.10.2005
138. Klinge U (2005) Narbenhernien – nur bei den anderen? State of the art lecture. 16. Berner Symposium, Bern 4.11.2005
139. Klinge (2006) Rezidivhernien – ein biologisches Problem? 123. Kongress der DGfC, Berlin 2.-5.5.2006
140. Klinge (2006) Modern hernia repair. Workshop Prof. Berger, Baden-Baden 28.4.2006
141. Müllen A, B Obolenski, B Klosterhalfen, U Klinge, U Göretzlehner: PVDF an optimal material for textile implants. 8. Dresdner Textiltagung 21.-22.6.2006
142. Klinge (2006) Komplikationen der minimal-invasiven Hernientherapie. Mic-Club West, Dinslaken, 19.5.2006
143. Klinge (2006) Auswahlkriterien für Netze. Hernienchirurgie 2006. Deutsche Herniengesellschaft Hannover 26.-27.5.2006
144. Klinge (2006) Modern hernia surgery. Hong Kong 28.6.2006

145. Klinge U (2006) Pathohistological data of meshes. 10th world congress of endoscopic surgery, Berlin 13.-16.9.2006
146. Klinge U (2006) Technical and biological aspects of meshes. 10th world congress of endoscopic surgery, Berlin 13.-16.9.2006
147. Klinge U (2006) Narbenhernie: chirurgische Fehler oder Schicksaal? Gastroenterologie 2006, 13.-16. September 2006, Hannover
148. Klinge U. Anatomical limitation for mesh positioning. 2nd Congress of the Asia pacific hernia society 2006, 6-8th October
149. Klinge U Recurrence as a problem of biology & collagens. 2nd Congress of the Asia pacific hernia society 2006, 6-8th october
150. U. Klinge Standardoperationen bei Tumoren des unteren GI-Traktes. Inderdisziplinärer Workshop GI Tumore. 20-12.10.2006, Bonn
151. U. Klinge Standardoperationen bei Tumoren des oberen GI-Traktes. Inderdisziplinärer Workshop GI Tumore. 20-12.10.2006, Bonn
152. Klinge U. Meshes in der Chirurgie. Berlin 4.11.2006 Uro-gynäkologische Tage
153. Klinge U. Biomaterials in ventral hernia surgery – experimental and functional aspects. Uppsalla 10.11.2006
154. Klinge U. Biomaterials in ventral hernia surgery – experimental and functional aspects. Uppsalla 10.11.2006
155. U. Klinge CRPS – ein Konzept der chronischen Leistenschmerzen? Kongreß der Deutschen Herniengesellschaft, Berlin, 15.-16. Juni 2007
156. U. Klinge Der chronische Leistenschmerz. 4.5.2007. Jahreskongreß der DGfC
157. Klinge U: Biomaterialien für die Hernienchirurgie: für wen, wie und wieviel? Berliner Hernien-Tage 18-20.1.2007
158. U. Klinge Porosität vvon textilen Strukturen. Kongreß der Deutschen Herniengesellschaft, Berlin, 15.-16. Juni 2007
159. U. Klinge The concept of flat meshes. 8.8.2007, Shanghai
160. U. Klinge How to prevent recurrences. 8.8.2007, Shanghai
161. U. Klinge Standardverfahren oder maßgeschneiderte Therapie – wo soll die Reise hingehen? Herbstkongreß der DGVC vom 12. bis 15.09.2007, Bochum
162. U. Klinge Evidence-basierte Datenlage zur chirurgischen Narbenhernien-Versorgung. Herbstkongreß der DGVC vom 12. bis 15.09.2007, Bochum
163. U. Klinge Was sind die Probleme mit schwergewichtigen Netzen? Herbstkongreß der DGVC vom 12. bis 15.09.2007, Bochum
164. U. Klinge Meshes in der Chirurgie, Hamburg ESI Mesh-Forum 17.9.2007
165. U. Klinge Update Hernienchirurgie, Freiburg, 8.10.2007
166. U. Klinge: Does material and porosity of meshes matter? 8th congress of the panhellenic surgical society of northern Greece, 18-21.10.2007, Thessaloniki
167. U. Klinge: Concept of CRPS in the groin, and strategies for treatment. Pain & Hernia surgery symposium, ESI, Hamburg, 30th October 2007
168. U. Klinge: The CRPS – concept for chronic pain in the groin? Rotterdam Interactive Congress on Hernia RICH 2007, 16.11.2007, Rotterdam
169. U. Klinge: The CRPS as concept for chronic pain? Belgium surgical society 2007, 29.11.2007, Brüssel
170. U. Klinge: Was können Goldstandards leisten? 14.12.2007 Berlin <http://www.gcp-workshop.de/1331.html>
171. U. Klinge: Concept of complex regional pain syndrome in the groin and strategies for treatment. 3<sup>rd</sup> annual meeting of IEHS 17.-19.1.2008 Stuttgart
172. U. Klinge Polyester, PVDF oder PTFE – kein, zwei oder vier Fluoratome? 2. Berliner Hernientage 25.-26.1.2008 Berlin



173. U. Klinge Schluß mit der Suche nach dem Gold-Standard! 2. Berliner Hernientage 25.-26.1.2008 Berlin
174. U. Klinge: Experimentelle Untersuchungen zu alloplastischen Materialien: Welche Eigenschaften sollten sie für die Verwendung am Beckenboden haben? 17. Urolog. Winterworkshop Leogang 28.01. - 01.02.2008
175. U. Klinge: Die Chirurgie der Leistenhernie – von der Stange oder nach Maß? Fortbildungsveranstaltung der AEKNO, Kreisstelle Duisburg 20.2.2008
176. U. Klinge: Experimental investigations with alloplastic materials: Which properties are essential for use at the pelvic floor? International collaboration of the pelvic floor ICOPF
177. U. Klinge: Welche Hernie braucht ein Mesh? 1. Tagung der Schweizer Herniengesellschaft in Bern, 4.4.2008
178. U. Klinge: Welche Probleme können bei der Verwendung von Netzen in der Hernienchirurgie auftreten? 125. Kongress der DGfC, 22.-25.4.2008, Berlin
179. U. Klinge : Low-weight polypropylene mesh: what is the clinical importance of the porosity for hernia repair? 30. congréß of the EHS, Sevilla, Spain: 7-10.5.2008
180. U. Klinge: Grundlagen der Hernienreparation aus Sicht des wissenschaftlichen Chirurgen. 5. Tagung der Deutschen Hernien-Gesellschaft, Baden-Baden: 29.-31.5.2008
181. U. Klinge: Postoperative CRPS in inguinal hernia patients. 5. Suvretta-Workshop, St. Moritz: 1.-7.7.2008
182. U. Klinge: Two controversial concepts: Standard procedure in a standard patient versus tailored surgery with procedures adjusted to individual patients? 5. Suvretta-Workshop, St. Moritz: 1.-7.7.2008
183. U. Klinge: Degradationsprozesse und Netzbrüche in der Hernienchirurgie. 3. Wilhelmsburger Hernientage, Hamburg: 5.-6.9.2008
184. U. Klinge: Update Biomaterialien und Netze in der Hernienchirurgie. 12. chir. Forschungstage, Freiburg: 25.7.-29.9.2008
185. U. Klinge: Classification of incisional hernia - from Aachen's point of view. Consensus meeting on the development of an EHS classification, Gent, Belgium, October 2nd - 4th 2008
186. U. Klinge: What should be considered for selection of mesh material. AHS, Beijing, 1.-2.11.2008
187. U. Klinge: The CRPS after groin hernia repair. AHS, Beijing, 1.-2.11.2008
188. U. Klinge: Hernia repair tailored to the patient instead of using a gold standard?. AHS, Beijing, 1.-2.11.2008
189. U. Klinge: Future perspectives in textile implants. AHS, Beijing, 1.-2.11.2008
190. U. Klinge: Update mesh. Shanghai. 28.11.2008
191. U. Klinge: Hernia and Collagen. 4. Rotterdam interactive congress for hernia, 21.11.2008, Rotterdam, NL
192. U. Klinge: Was ist bei der Auswahl von Meshes zu beachten? Zürser Hernienforum 14.12.-16.12.2008, Zürs, Austria
193. nicht mehr aktualisiert
194. U. Klinge, N. Farthmann, A. Fieber: Aldosterone network. San Diego, 17.6.2010
195. U. Klinge et al: ISIR, Rostock, chirurgische Forschungstage  
... not longer actualised .....

## Oral presentation, on invitation:

1. U.Klinge Review of literature and experimental results of mesh surgery Expert-Meeting Suffretta-House St. Moritz Feb. 1994
2. U.Klinge Pathophysiologie der Narbenhernie Chirurgentag Nürnberg 24.10.1996
3. Conze, J., U Klinge (1998) Biocompatibility of biomaterials – clinical and mechanical aspects. II Suvretta meeting: abdominal wall: function, defects and repair. 8.-14.3.1998 St. Moritz Swiss
4. U. Klinge, B Klosterhalfen (1998) Biocompatibility of biomaterials – experimental aspects. II Suvretta meeting: abdominal wall: function, defects and repair. 8.-14.3.1998 St. Moritz Swiss
5. B. Klosterhalfen, U. Klinge (1998) Biocompatibility of biomaterials – histological aspects. II Suvretta meeting: abdominal wall: function, defects and repair. 8.-14.3.1998 St. Moritz Swiss
6. U. Klinge (1998) Meshes zur Hernienreparation. 7. Interdisziplinäres Forum der Förderung operativer medizinisch-wissenschaftlicher Fachgesellschaften 17.10.1998 Wiesbaden
7. U. Klinge (1999) Chirurgie der Narbenhernie. 5. Kölner Tagung ambulantes Operieren. Köln, 7.5.1999
8. U. Klinge (1999) Pathophysiologie der Bauchdecke. Weißenseer Operationskurs 24.9.99
9. U. Klinge (1999) Rezidive und Patientenkomfort im Langzeitverlauf. Weißenseer Operationskurs 24.9.99
10. U. Klinge (7.12.1999) Meshes in der Hernienchirurgie. 5. Zürser Hernienforum, Zürs, Austria
11. U. Klinge (9.3.2000) Narbenhernienchirurgie: Primärverschluß oder Netzimplantat? Interdisziplinäre Viszeralchirurgie am Inselspital, Bern, Schweiz
12. U. Klinge (3.5.2000) Biomaterialien in der Hernienchirurgie. FomwF, 117. Kongreß der Deutschen Gesellschaft für Chirurgie 2.-6.5.2000, Berlin
13. U. Klinge (4.5.2000) Epidemiologie und Pathophysiologie der Bauchwanddefekte. Narbenhernie, 117. Kongreß der Deutschen Gesellschaft für Chirurgie 2.-6.5.2000, Berlin
14. U. Klinge (26.5.2000) Anatomy and physiology of the abdominal wall. Laparoscopic incisional hernia repair a standard therapy? Rastatt, 25.5-27.5.2000
15. U. Klinge (2.6.2000) Technical aspects, abdominal wall physiology, integration and inflammatory reaction. 35. ESSR-Kongreß, Malmö, 1.-3.6.2000
16. U. Klinge (2.6.2000) News and future outlooks. 35. ESSR-Kongreß, Malmö, 1.-3.6.2000
17. U. Klinge (2000) Pathophysiologie der Bauchdecke. Weißenseer Operationskurs 2000, 8.9.2000, Berlin
18. U. Klinge (2000) Rezidive und Patientenkomfort im Langzeitverlauf. Weißenseer Operationskurs 2000, 8.9.2000, Berlin
19. U. Klinge (2000) Netzimplantate in der Hernienchirurgie – Charakteristika und Anforderungen. Netzimplantate 22.-23.9.2000, Würzburg
20. U. Klinge (2000) Minimierte Polypropylen-Netze zur präperitonealen Netzplastik – prospektive Studie. 22.-23.9.2000, Würzburg
21. U. Klinge (2000) Implantierbare Netze in der Chirurgie – Nutzen oder Risiko? Fortbildungsveranstaltung der Kreisstelle Mülheim/Ruhr 10.10.2000, Evang. Krankenhaus Mülheim a. d. Ruhr
22. U. Klinge, B. Klosterhalfen, V. Schumpelick (2000) Kollagenstoffwechselstörungen und Konsequenzen für die chirurgische Therapie. Gründungskongress der Arbeitsgemeinschaft Wundheilung der DGfC, 13-14.10.2000 Tübingen
23. U. Klinge (2000) Offene Mesh-augmentierte Reparatursverfahren der Leistenhernie. 12. Wuppertaler Workshop für laparoskopische Operationen, 16.-17.11.2000, Wuppertal

24. U. Klinge (2001) Netzimplantate in der Hernienchirurgie: Charakteristika und Anforderungen. Implantate in der Hernienchirurgie – Quo vadis? 2.-4.4.2001, European Surgical Institute, Norderstedt
25. Klinge, U (2001) Rezidivoperationen und Biomaterial. 1668. Jahrestagung der Vereinigung Niederrheinsich-Westfälischer Chirurgen, 27.-29.9.2001 Bielefeld
26. Klinge, U (2001) Rezidive und Patientenkomfort im Langzeitverlauf. 3. Weißenseer Operationskurs 28.-29.9.2001, Berlin
27. Klinge U (2001) Welcher Patient bekommt ein Rezidiv? Aktueller Stand der Forschung. Workshop Viszeralchirurgie 24.-26.10.2001
28. Klinge U (2002) Epidemiologie, Pathologie und sozioökonomische Bedeutung der Narbenhernie. Baden-Baden 21-23.2.2002: Symposium Laparoskopische und konventionelle Narbenhernienreparation. Konkurrierende oder ergänzende Verfahren?
29. Klinge U (2002) Shouldice Methode der Wahl? Symposium 20.4.2002, European Surgical Institute, Norderstedt
30. Klinge U (2002) Pathophysiological concept for hernia repair. ESSR Congress Szeged, 23.-25.5.2002
31. Klinge, U (2002) Der Shouldice. 18. Krefelder Chirurgen-Symposium, 12.6.2002, Krefeld
32. Klinge U (2002) Die parastomale Hernie – seine Ursachen und Möglichkeiten der Therapie. ILCO Aachen, 26.8.2002, Aachen
33. Klinge, U (2002) Impact of mesh material on clinical results. III Spotkanie Polskiego Klubu Przepuklinowego 20.-21.9.2002, Bydgoszcz, Poland
34. Klinge U (2002) Epidemiologie und Pathogenese der Narbenhernie sowie Ansätze zu deren Reparation. 2. Österreichischer Chirurgentag, Baden, 22.-23.11.02
35. Klinge U (2003) How to construct a mesh? III. Suvretta meeting 14.-18.1.2003-01-22
36. Klinge U (2003) Mesh materials: tissue response and tissue engineering. ESAO 3.9-6.9.2003, Aachen
37. Klinge U (2004) Laparoskopische Narbenhernienreparation – Contra. Mic-Club West, 2. 4. 2004, Aachen
38. Klinge U (2004) Spätfolgen und –ergebnisse nach Netzimplantation in der Bauchdecke. 10. 10. Kölner Tagung des BDC „Ambulante Chirurgie in Klinik und Praxis“, 14.-15.5.2004, Köln, Crowne Plaza Hotel
39. Klinge, Uwe (2004) Incisional hernia: Laparoscopic versus open – open. 12th international Congress of the European Association for endoscopic surgery, 9-12.6.2004, Barcelona
40. Klinge, Uwe (2004) Vorteile der konventionellen Hernienchirurgie. Marburg, 30.6.2004
41. Klinge, Uwe (2004) Das Netz als Gewebeersatz. 2. Mitteldeutscher Chirurgenkongress, Leipzig 23.-25.9.2004-09-27
42. Klinge U (2004) Pathophysiology and therapeutic impact of meshes. Utrecht 13.9.2004
43. Klinge U (2004) Biomaterials for Hernia repair. Utrecht 13.9.2004
44. Klinge U (2004) Standardoperationen – unterer GI-Trakt. Workshop Praktische Onkologie, Bonn 23.-24.10.2004
45. Klinge U (2004) Standardoperationen – oberer GI-Trakt. Workshop Praktische Onkologie, Bonn 23.-24.10.2004
46. Klinge U (2004) Novel textile structures in medicine. 31th Aachen Textile conference, 24.-25.11.2004, Aachen, Eurogress
47. Klinge U (2.1.2005) Complications in open incisional hernia, European hernia symposium, London
48. Klinge (2.1.2005) Evidence based open IH, European hernia symposium, London
49. Klinge, U (2005) Nabel-, Narbenhernie. BDC-Seminar, Kassel, 14.-18.2.2005
50. Klinge, U (2005) Open-Non-Mesh: Shouldice – the good old way. 16.2.2005 Leistenhernienchirurgie 2005, Bethlehem-Krankenhaus, Stolberg

51. Klinge U (2005) Alloplastische Implantate und Gewebereaktion. Luzern 22.9.2005 1. gemeinsame Fortbildung der Vereinigung der Gynäkologen Luzern/Zentralschweiz
52. Klinge U (2005) Standardoperationen – unterer GI-Trakt. Workshop Praktische Onkologie, Bonn 14.-16.10.2005
53. Klinge U (2005) Standardoperationen – oberer GI-Trakt. Workshop Praktische Onkologie, Bonn 14.-16.10.2005
54. Klinge U (2005) Narbenhernien – nur bei den anderen? State of the art lecture. 16. Berner Symposium, Bern 4.11.2005
55. Klinge (2006) Rezidivhernien – ein biologisches Problem? 123. Kongress der DGfC, Berlin 2.-5.5.2006
56. Klinge (2006) Modern hernia repair. Workshop Prof. Berger, Baden-Baden 28.4.2006
57. Klinge (2006) Komplikationen der minimal-invasiven Hernientherapie. Mic-Club West, Dinslaken, 19.5.2006
58. Klinge (2006) Auswahlkriterien für Netze. Hernienchirurgie 2006. Deutsche Herniengesellschaft Hannover 26.-27.5.2006
59. Klinge (2006) Modern hernia surgery. Hong Kong 28.6.2006
60. Klinge U (2006) Pathohistological data of meshes. 10th world congress of endoscopic surgery, Berlin 13.-16.9.2006
61. Klinge U (2006) Technical and biological aspects of meshes. 10th world congress of endoscopic surgery, Berlin 13.-16.9.2006
62. Klinge U (2006) Narbenhernie: chirurgische Fehler oder Schicksaal? Gastroenterologie 2006, 13.-16. September 2006, Hannover
63. Klinge U. Anatomical limitation for mesh positioning. 2nd Congress of the Asia pacific hernia society 2006, 6-8th October
64. Klinge U Recurrence as a problem of biology & collagens. 2nd Congress of the Asia pacific hernia society 2006, 6-8th October
65. U. Klinge Standardoperationen bei Tumoren des unteren GI-Traktes. Inderdisziplinärer Workshop GI Tumore. 20-12.10.2006, Bonn
66. U. Klinge Standardoperationen bei Tumoren des oberen GI-Traktes. Inderdisziplinärer Workshop GI Tumore. 20-12.10.2006, Bonn
67. Klinge U. Meshes in der Chirurgie. Berlin 4.11.2006 Uro-gynäkologische Tage
68. Klinge U: Biomaterialien für die Hernienchirurgie: für wen, wie und wieviel? Berliner Hernien-Tage 18-20.1.2007
69. U. Klinge Der chronische Leistenschmerz. 4.5.2007. Jahreskongreß der DGfC
70. U. Klinge The concept of flat meshes. 8.8.2007, Shanghai
71. U. Klinge How to prevent recurrences. 8.8.2007, Shanghai
72. U. Klinge Standardverfahren oder maßgeschneiderte Therapie – wo soll die Reise hingehen? Herbstkongreß der DGVC vom 12. bis 15.09.2007, Bochum
73. U. Klinge Evidence-basierte Datenlage zur chirurgischen Narbenhernien-Versorgung. Herbstkongreß der DGVC vom 12. bis 15.09.2007, Bochum
74. U. Klinge Was sind die Probleme mit schwergewichtigen Netzen? Herbstkongreß der DGVC vom 12. bis 15.09.2007, Bochum
75. U. Klinge Meshes in der Chirurgie, Hamburg ESI Mesh-Forum 17.9.2007
76. U. Klinge Update Hernienchirurgie, Freiburg, 8.10.2007
77. U. Klinge: Does material and porosity of meshes matter? 8th congress of the panhellenic surgical society of northern Greece, 18-21.10.2007, Thessaloniki
78. U. Klinge: Concept of CRPS in the groin, and strategies for treatment. Pain & Hernia surgery symposium, ESI, Hamburg, 30th October 2007
79. U. Klinge: The CRPS – concept for chronic pain in the groin? Rotterdam Interactive Congress on Hernia RICH 2007, 16.11.2007, Rotterdam

80. U. Klinge: The CRPS as concept for chronic pain? Belgium surgical society 2007, 29.11.2007, Brüssel
81. U. Klinge: Was können Goldstandards leisten? 14.12.2007 Berlin, <http://www.gcp-workshop.de/1331.html>
82. U. Klinge: Concept of complex regional pain syndrome in the groin and strategies for treatment. 3<sup>rd</sup> annual meeting of IEHS 17.-19.1.2008 Stuttgart
83. U. Klinge Polyester, PVDF oder PTFE – kein, zwei oder vier Fluoratome? 2. Berliner Hernientage 25.-26.1.2008 Berlin
84. U. Klinge Schluß mit der Suche nach dem Gold-Standard! 2. Berliner Hernientage 25.-26.1.2008 Berlin
85. U. Klinge: Experimentelle Untersuchungen zu alloplastischen Materialien: Welche Eigenschaften sollten sie für die Verwendung am Beckenboden haben? 17. Urolog. Winterworkshop Leogang 28.01. - 01.02.2008
86. U. Klinge: Die Chirurgie der Leistenhernie – von der Stange oder nach Maß? Fortbildungsveranstaltung der AEKNO, Kreisstelle Duisburg 20.2.2008
87. U. Klinge: Experimental investigations with alloplastic materials: Which properties are essential for use at the pelvic floor? International collaboration of the pelvic floor ICOPF
88. U. Klinge: Welche Hernie braucht ein Mesh? 1. Tagung der Schweizer Herniengesellschaft in Bern, 4.4.2008
89. U. Klinge: Welche Probleme können bei der Verwendung von Netzen in der Hernienchirurgie auftreten? 125. Kongress der DGfC, 22.-25.4.2008, Berlin
90. U. Klinge : Low-weight polypropylene mesh: what is the clinical importance of the porosity for hernia repair? 30. congress of the EHS, Sevilla, Spain: 7-10.5.2008
91. U. Klinge: Grundlagen der Hernienreparation aus Sicht des wissenschaftlichen Chirurgen. 5. Tagung der Deutschen Hernien-Gesellschaft, Baden-Baden: 29.-31.5.2008
92. U. Klinge: Postoperative CRPS in inguinal hernia patients. 5. Suvretta-Workshop, St. Moritz: 1.-7.7.2008
93. U. Klinge: Two controversial concepts: Standard procedure in a standard patient versus tailored surgery with procedures adjusted to individual patients? 5. Suvretta-Workshop, St. Moritz: 1.-7.7.2008
94. U. Klinge: Degradationsprozesse und Netzbrüche in der Hernienchirurgie. 3. Wilhelmsburger Hernientage, Hamburg: 5.-6.9.2008
95. U. Klinge: Update Biomaterialien und Netze in der Hernienchirurgie. 12. chir. Forschungstage, Freiburg: 25.7.-29.9.2008
96. U. Klinge: Classification of incisional hernia - from Aachen's point of view. Consensus meeting on the development of an EHS classification, Gent, Belgium, October 2nd - 4th 2008
97. U. Klinge: What should be considered for selection of mesh material. AHS, Beijing, 1.-2.11.2008
98. U. Klinge: The CRPS after groin hernia repair. 4th International Congress of the Asia-Pacific Hernia Society, 5th Annual Conference of China hernia Society, 30.10.-2.11.2008, Beijing
99. U. Klinge: Hernia repair tailored to the patient instead of using a gold standard?. 4th International Congress of the Asia-Pacific Hernia Society, 5th Annual Conference of China hernia Society, 30.10.-2.11.2008, Beijing
100. U. Klinge: Future perspectives in textile implants. 4th International Congress of the Asia-Pacific Hernia Society, 5th Annual Conference of China hernia Society, 30.10.-2.11.2008, Beijing
101. U. Klinge: Update mesh. Master class Shanghai. 28.11.2008
102. U. Klinge: Hernia and Collagen. 4. Rotterdam interactive congress for hernia, 21.11.2008, Rotterdam, NL



103. U. Klinge: Was ist bei der Auswahl von Meshes zu beachten? Zürser Hernienforum 14.12.-16.12.2008, Züri, Austria
104. U. Klinge: Die „männliche Schlinge“ zur Therapie der Harninkontinenz. AGKAMED „Neue Behandlungswege der männlichen Inkontinenz“, Berlin, 12.5.2009
105. U. Klinge: Was bedeutet Biokompatibilität in der Chirurgie. 1.5.2009 München, Jahreskongreß der DGFC
106. U. Klinge: Lightweight mesh Konzept. 28.4.2009 München, Jahreskongreß der DGFC
107. U. Klinge: Welche Netze für die offene/laparoskopische Narbenhernienreparation ?. 30.4.2009 München, Jahreskongreß der DGFC
108. U. Klinge: Biomechanische Anforderungen: Was sollen und können Netze leisten ? 30.1.2009, Berlin 3-Chirurgen
109. U. Klinge: What has to be considered for selection of alloplastic nets and slings at the pelvic floor? 28.3.2009, Dijon
110. U. Klinge: Leuven Aachen Rotterdam Herniosis Studygroup LARHS 10.4.2009, Leuven
111. U. Klinge. Biologicals für die Hernienchirurgie? Jahreskongreß der Deutschen Herniengesellschaft in Neuss, 19-20.6.2009
112. U. Klinge. Mesh – structure or confusion? 4. Internationaler Welthernienkongreß in Berlin 9.-12.9.2009
113. U. Klinge: Das ideale Mesh? Euregio Bodensee, 3.7.2009 St. Gallen
114. U. Klinge: Limitation and perspective of Biologicals. Leeds, 23.10.2009
115. U. Klinge: Update Narbenhernienchirurgie unter Einbeziehung von Grundlagen der Netzstabilität. Chirurgische Abteilung, Uniklinik Essen, 26.10.2009
116. U. Klinge: Principles of hernia repair. Masterclass Baden-Baden, 20.11.2009
117. U. Klinge: Biologicals. Masterclass Baden-Baden, 21.11.2009
118. U. Klinge: Update Literature for hernia. Masterclass Baden-Baden, 20.11.2009
119. U. Klinge: Textile structures for the pelvic floor. Kopenhagen, 27.11.2009
120. U. Klinge: Biologicals as standard for hernia repair. 4. Berliner Hernien-Tage, 28.1.2010
121. U. Klinge: Das ideale Mesh: 4. Berliner Hernien-Tage, 30.1.2010
122. U. Klinge: Große Datenmengen für die Medizin? Arbeitstreffen E-Health, RWTH-Aachen, 25.1.2010
123. U. Klinge: Was unterscheidet die Netze ? DGfC Berlin 2010
124. U. Klinge: the ideal mesh. Oslo 4/2010
125. U. Klinge: What is the ideal mesh? Dubai 4/2010
126. U. Klinge: biologicals for every hernia? Dubai 2010
127. U. Klinge: mesh classification? Dubai 2010
128. U. Klinge: Meshes für die Chirurgie. Fulda, EKK 17.5.2010
129. U. Klinge: Hernie - Gibt es eine einfache „Pathophysiologie“ München 11.6.2010 Deutsche Herniengesellschaft
130. U. Klinge: Wie kann man Meshes klassifizieren? BvMed 2.7.2010
131. U. Klinge: Gibt es eine einfache Pathophysiologie, DHG München, 10-12.6.2010
132. U. Klinge: Mesh in der Leistenhernienchirurgie. Schwarzenberg, Scheyer, Austria 1.-3.7.2010
133. U. Klinge: Basic principles of mesh implants and actual status of knowledge. Liedl, München Bogenhausen, 13-14.10.2010
134. U. Klinge: Alloplastische Materialien in der Hernienchirurgie – was gibt es Neues? Wilhelmsburger Hernientage 23-24.10.2010
135. U. Klinge: Biomechanics, immunology and tissue response to the mesh. Brazilian hernia Congress November 25th to 27th, 2010 InterContinental Hotel Rio de Janeiro

136. U. Klinge: Biologicaals. Brazilian hernia Congress November 25th to 27th, 2010 InterContinental Hotel Rio de Janeiro
137. U. Klinge: Sublay, Why and How ? Brazilian hernia Congress November 25th to 27th, 2010 InterContinental Hotel Rio de Janeiro
138. U. Klinge: Paracolostomic hernia. Brazilian hernia Congress November 25th to 27th, 2010 InterContinental Hotel Rio de Janeiro
139. U. Klinge: PVDF. Brazilian hernia Congress November 25th to 27th, 2010 InterContinental Hotel Rio de Janeiro
140. U. Klinge. Prophylaxe der Hernienentstehung? Berliner Hernientage 24-29.1.2011
141. U. Klinge: Grundlagen und Materialien. Berliner Hernientage 24-29.1.2011
142. U. Klinge: Classification of surgical meshes for hernia repair. EHS, Gent, 11-13.5.2011
143. U. Klinge: Risk factors for incisional hernia development. EHS, Gent, 11-13.5.2011
144. U. Klinge: Statistics and analysis for biological material in hernia treatments – the current status quo. Cook Symposium. Berlin, 19-20.5.2011
145. U. Klinge: Biologische Netze heute. 1. Düsseldorfer Herniensymposium. 2.4.2011
146. U. Klinge: Chaos bei den Kunststoffnetzen: Vorschlag zur standardisierten Einteilung. DHG Oldenburg, 26-28.5.2011
147. U. Klinge: Das ideale Mesh. Fürth, 30.6.2011
148. U. Klinge: Surface modification: do we really need it ? EHS Winter conference, Madonna di Castillo, 10-12.3.2011
149. U. Klinge: Abdominal wall hernia, current update. 10. – 12.11.2012 Masterclass Baden-Baden
150. U. Klinge: Prophylaxe der Hernienentstehung. Symposium Rotkreuzklinikum München. 25.11.2012
151. U. Klinge: "Surface modification to direct tissue response" RICH, Rotterdam, 13.1.2012
152. U. Klinge: Grundlagen und Materialien. Hernia Kompakt, Hamburg, 19.1.2012
153. U. Klinge: Klassifikation von Netzimplantaten in der Hernienchirurgie. 4. Wilhelmsburger Hamburg, 20.1.2012
154. U. Klinge: Evidence based medicine - Was sollen wir glauben? 25.4.2012, DGfC, Berlin
155. U. Klinge: Uni Essen Chirurgie-Fortbildung: Hernienchirurgie – wann welches Netz. 21.5.2012
156. U. Klinge: Classification of meshes for risk assessment. EuraHS, Brüssel, 7.6.2012
157. U. Klinge: Change in pore size and weight of abdominal wall meshes: What did it bring us so far? Brüssel, 25.10.2012
158. U. Klinge: Materialien in der Hernienchirurgie. Hernia Kompakt München, 24-26.10.2012
159. U. Klinge: EBM – was sollen wir glauben. Hernie interaktiv, München, 27.10.2012
160. U. Klinge: From view of experimental surgeon – meshes for pelvic floor. Munic, 17.11.2012
161. U. Klinge: Biomechanic aspects of meshes for pelvic floor surgery. Expert class Cologne Prof. Jäger, 7.-8.12.2012
162. U. Klinge Klassifikation der Netze. 25.-26.1.2013, 6. Berliner Hernientage
163. U. Klinge Sichtbare Netze, erste Ergebnisse, 25.-26.1.2013, 6. Berliner Hernientage.
164. U. Klinge Netz- und Materialentwicklung: Biomaterialien in der Chirurgie: Fluch oder Segen ? 59. Kongress der Nordrhein-Westfälischen Gesellschaft für Urologie. 11. – 12. April 2013 |Rheinterrasse Düsseldorf.
165. U. Klinge: Individual patient centred outcome research as alternative to randomized controlled trials (RCT). Gdansk EHS 14.5.2013, EHS

166. U. Klinge: Ist Randomisierung der Schlüssel zur evidenzbasierten Hernienchirurgie ?  
Cottbus 7.-8.6.2013, DHG
167. U. Klinge Das richtige Netz TAPP / TEP / offen. Saale-Unstrut, 29.6.2013
168. U. Klinge. Textile meshes in Surgery:  
FDA Warnings – New Standards – Registries - What can we learn from Hernia Surgery?  
Barcelona ICS. 29.8.2013
169. U. Klinge Moderne Netz-Technologie. 2. Düsseldorfer Hernien-Symposium Zarras,  
26.9.2013

## Grants

	<b>Principal investigator, co-workers</b>	<b>topic</b>	<b>Supporter, duration</b>	<b>period</b>	<b>Amount of resources</b>
	Klinge, Hörer	Panacryl-Fadenstudie	Ethicon / 3 Jahre	1999-2002	260.000
	Klinge, Welty	Internationale Vypro-Studie	Ethicon / 3 Jahre	1999-2002	54.000
	Klinge, Welty	SHM-Studie	Ethicon / 2 Jahre	1997-1999	262.000
	Klinge	Kollagen-Studie	Ethicon / ½ Jahr	1999	30.000
TV 9	Klinge	Verwendung von Biomaterialien beim Bauchdeckenverschluß	BIOMAT 4 Jahre	1995-1998	208.107
TV 41/42	Klinge/Steinau	PVDF-Mesh	BIOMAT 2 Jahre Nachfolgeprojekt 2 Jahre	1999-2000 2001-2002	347.940
	Klinge	Mesh-Entwicklung	Ethicon	2000-2003	375.000 Kostenstelle: 9876170 Anforderungsnummer: 98761770
TV 66	Mertens, Klinge	Mesh-Fibroblasten	BIOMAT	2001-2002	330.000
TV 61	Bertram, Tietze, Klinge	Kokulturen	BIOMAT	2001-2002	210.000
FEG/BMBF	Klinge, Klosterhalfen	Entwicklung von neuartigen bioverträglichen Netzmaterialien zur anatomisch angepaßten chirurgischen Hernientherapie - Beschichtete Meshes	03N4024 FEG-065/1-2001	1.3-2001-2004	358.824,-
DFG	Klinge, Klosterhalfen, Mertens	Kollagen und Hernie	KL 1320/2-1	21.6.2001-21.6.2003	350.000,-
Ethicon	Schumpelick,	Optimierung von Mesh-Strukturen	370253	1.4.2003-	360.000 €

	<b>Principal investigator, co-workers</b>	<b>topic</b>	<b>Supporter, duration</b>	<b>period</b>	<b>Amount of resources</b>
	Klinge, Stumpf, Junge, Schachtrupp, Steinau, Schwab			31.3.2006	
DFG	Lynen-Jansen Mertens Klinge Jansen	Einfluß von Biomaterialien auf die MMP-2 Genexpression in vivo	DFG JA1123/1-1	2004-2005	120.000 Euro
DFG-Projekt	Lynen-Jansen Mertens Klinge Jansen ,	Untersuchungen zur Gewebe-Integration von Biomaterialien bei selektiver Blockade der TNF $\alpha$ -abhängigen MMP-2 Expression'	DFG JA 1123/1-2,	Laufzeit 2 Jahre, Umfang Start 2008	ca. 120.000 Euro,
INNONET	HIA und Frauenhofer	Die sichere Naht	VDI/VDE	2/2008-2011	Gesamtvolume n 1,1 Mill €
Mesh insight	FEG und UK-Aachen Klinge U, Otto J, Krämer N, Obolenski B:	Sichtbarmachung von textilen Implantaten im MRT durch Einlagerung von superparamagnetischen Eisenoxid-Nanopartikeln. Innovationswettbewerb 2007 des BmbF zur Förderung der Medizintechnik, 18.10.2007	BMBF 01EZ0849	1.4.2008-31.1.2011. 3.2008-1.2.2011	Gesamtvolume n ca. 900.000€
	Kämmer, Otto, Klinge	PVDF-Mesh Beschichtung mit NN-Hormonen	ESAC	2008	12 000€
Bioinside	FEG/Fiebeler/Berlin	Beschichtung mit DHEA	BMBF BioInside 13N9827-13N9833 PN 372552	2008-2010	70 000€
	Klinge	InnoMeT.NRW: Patientenadaptierte Medizintechnische Lösungen für die Kardiovaskuläre Therapie	005-1003-0067 IAN 700584	1.8.2010-31.7.2013	270 000
	Klinge	Elastisches Netz-Implantat für die Chirurgie am Zwerchfell (Hiatus-Mesh)	ZIM-Projekt KF2621701AJ0	14.4.2010-31.10.2011	110 000€
	Klinge/Tolba	Covidien Stapler Pase I	372708	1.2.2010-31.1.2011	120 000 Eur
	Klinge/Tolba	Covidien Stapler Pase II	372708	1.4.2011-31.3.2012	180 000 Eur
	Klinge et al, ZIM 3D	3D Implantat	ZIM / AiF 13EZ1201C	1.10.11-30.9.2013	174 893 €
	Klinge et al. ZIM Hiatus-Mesh	Zwerchfell-Netzimplantat	ZIM / AiF KF2621701AJ0	1.4.10-31.11.2011	110 365 €
	Klinge et al E-	Elastisches Mesh	01EZ1201C	1.6.2012-	240 000€

	<b>Principal investigator, co-workers</b>	<b>topic</b>	<b>Supporter, duration</b>	<b>period</b>	<b>Amount of resources</b>
	Mesh BMBF (DLR)			31.5.2015	

## Patents:

02754251.3-2107-DE0202287 FEG Textiltechnik vom 25.6.02: Textiles Implantat mit monofilen Polyvinylidenfluorid-Fäden

„Einstückiges Stomaunterstützungsimplantat“ WO 2008/031411 A1

„Medizinisches Implantat mit Oberflächenbeschichtung“ AZ 10 2009 005 792.7

„Meshförmiges Implantat“ (Mesh mit Ferrofluiden) PCT/DE 2008/000805

„Textiles Intraperitoneal-Mesh“ DE 10353930.1

„Textiles Erzeugnis mit Oberflächenmodifikation und entsprechendes Verfahren zur Oberflächenmodifikation“ PCT/DE02/04291

„Textiles Implantat“ WO PCT/DE02/02287



# EXHIBIT

# B

Date	Bates Number	Title
November 2010- October 2011	ETH.MESH.00562421	Untitled PPT update
3/26/2008	ETH.MESH.02170708	Email from David Robinson to Dr. Vincent Lucente re: UP
	ETH.MESH.01760854	David Robinson, Gynemesh PS Clinical Expert Report
8/14/2007	ETH.MESH.00869908	Thunder Meeting Minutes
7/31/2007	ETH.MESH.01819505	Thunder Meeting Minutes
	ETH.MESH.01405166	"Exploratory Program 'Thunder' A Material designed for Pelvic Floor" Powerpoint presentation By: Clifford Volpe and Peter Meier
4/12/2007	ETH.MESH.00832555	Thunder Meeting Minutes
	ETH.MESH.00742724	"Ethicon Women's Health & Urology: Project Lightning Update"
2/13/2006	ETH.MESH.00585937	Email from Gene Kammerer to Quentin Manley et al re: TVM Discussions
2/26/2004	ETH.MESH.02270823	Email from Joshua Samon to Scott Ciarrocca et al. re: mesh implants - user needs
1/18/2005	ETH-18761	Email from Kelly Brown to Gene Kammerer re: Proposal for work with CBAT
3/25/2004	ETH.MESH.01988643	Email from Vincenza Zaddem to Scott Ciarrocca re: disclosure questions
	ETH.MESH.01424246	Holste, J; Test report No.: B0086/02, Histopathological report/Immunohistochemical report
2001	ETH.MESH.02017169	Hellhammer, B., <i>Mesher in Pelvic Floor Repair – Findings from literature review and interviews with surgeons.</i>
	ETH.MESH.03719177	Chris Vailhe report “Polypropylene Mesh for Pelvic Floor Repair (PFR) – Focus on Mesh Exposure – Road to Improvement
06/2009	ETH.MESH.02157879	Klosterhalfen B., <i>Interim Report Mesh Explants Pelvic Floor Repair</i>
	ETH.MESH.01819528	WW Customer Complaints – received from Carey Brennan
1/13/2005	ETH.MESH.02286052	Email from Sean O'Bryan to Scott Ciarrocca re: IFU Prolift
03/2009	ETH.MESH.00017369	Elmer C, Blomgren B, Falconer C, Zhang A, and Altman D; <i>Histological Inflammatory Response to Transvaginal Polypropylene Mesh for Pelvic Reconstructive Surgery.</i> The Journal of Urology Vol. 181, 1189-1195, March 2009

01/2009	ETH.MESH.00017239	Elmer C., Altman D., Ellstom Engh M., Axelsen S., Vayryen T., and Falconer C.; <i>Trocar-Guided Transvaginal Mesh Repair of Pelvic Organ Prolapse</i> . ACOG Vol. 113, No. 1, January 2009
2/1/2006	ETH.MESH.0394544	Memo to Sunny Rha re: Global Regulatory Strategy - Gynecare TVT - Laser Cutting Project
11/21/2005	ETH.MESH.00301741	Email From Dan Lamont to Jacqueline Flatow re: !!!!!GREAT NEWS FOR TVT LASER CUT MESH!!!!
10/12/2005	ETH.MESH.0353750	Letter from Carol Holloway to Herve Fournier re: TVT Device, Blue Mesh
	ETH.MESH.02059212	Prolift Surgical Guide
	ETH.MESH.01221055	Pariente J-L; <i>An independent biomechanical evaluation of commercially available suburethral slings</i> . Issues in Women's Health
6/6/2000	ETH.MESH.03904451	Meshes in Pelvic Floor Repair
11/22/2006	ETH.MESH.02992137	Lightning Clinical Strategy
4/5/2007	ETH.MESH.01218361	"State of the knowledge in 'mesh shrinkage' - What do know" by Kerstin Spychaj
3/4/2008	ETH.MESH.00832562	Thunder Meeting Minutes
12/18/2007	ETH.MESH.00832562	Thunder Meeting Minutes
2010	ETH.MESH.01192895	Velemir L, Amblard J, Fatton B, Savary D, Jacquetin B, <i>Transvaginal mesh repair of anterior and posterior vaginal wall prolapse: a clinical and ultrasonographic study</i> . Ultrasound Obstet Gynecol (2010)
6/22/2011	ETH.MESH.07192929	PA Consulting report "Investigating Mesh Erosion in Pelvic Floor Repair"
2/27/2008	ETH.MESH.03731339	Email from Dan Smith to Matter Henderson, et al. re: tape position at rest
2/28/2005	ETH-03558	DDSA
2/17/2011	ETH.MESH.01264497	Email from Vincenza Zaddem to Vernon Ghee et al. re: Mesh pore size - tissue compliance and contraction
1/17/2010	ETH.MESH.01785259	Email from Dr. Piet Hinoul to Dr. David Robinson, et al. Re: +M relaxation
4/22/2009	ETH.MESH.02148431	Email from Dr. Joerg Holste to Jonathan Meet, et al. re: Question on Monocryl absorption
11/18/2008	ETH.MESH.00008072	Ethicon PFR online training course
8/23/2007	ETH.MESH.00000272	Email from Vincenza Zaddem to David Robinson re: macroporous - lower limit of pore size
3/28/2007	ETH.MESH.00593165	Vailhe Technical report
	ETH.MESH.00237968	"R&D Perspective - The Journey from Prolift to Prolift +M" Powerpoint by Cliff Volpe

2007	ETH.MESH.01782867	"Factors Related to Mesh Shrinkage" by Kerstin Spychaj
2/23/2007	ETH.MESH.02017152	Expert Meeting Minutes
6/2/2006	ETH.MESH.00870466	Expert Meeting Minutes
6/14/2006	ETH-83454	Email from Scott Ciarrocca to Rebecca Leibowitz, et al. re: Mesh Microns
2/5/2008	ETH.MESH.01259495	David Robinson, Gynecare Prolift +M Pelvic Floor Repair System Clinical Expert Report
	ETH-83788	Ethicon Corporate Product Characterization analysis by Dan Burkley
	ETH-00291	GPS for Pelvic Floor Repair
2005	ETH.MESH.02232937	Klosterhalfen, B., K. Junge, and U. Klinge, <i>The lightweight and large porous mesh concept for hernia repair</i> .
2004	ETH.MESH.00280338	Berrocal J., Clave H., Cosson M., Debodinance Ph., Garbin O., Jacquetin B., Rosenthal C., Salet-Lizee D., Villet R., <i>Conceptual advances in the surgical management of genital prolapse The TVM Technique;</i>
10/14/2003	ETH.MESH.01220710	Email from Gene Kammerer to Georgina NG re: Technical data on competitive meshes from Europe
4/22/2003	ETH.MESH.02183533	Email from Dan Burkley to Elizabeth Vailhe re Pore Size Request
2/8/2002	ETH.MESH.00199408	Gynemesh PS Design Validation Strategy
2002	ETH.MESH.02232930	Klinge U., Klosterhalfen B., Birkenhauer V., Junge K., Conze J., and Schumpelick V., <i>Impact of Polymer Pore Size on the Interface Scar Formation in a Rat Model</i> .
2/28/2008	ETH.MESH.02590865	"Thunder: Technical Review" powerpoint presentation
1/16/2001	ETH.MESH.01160507	Email from Edward Dormier including the December 2000 Corporate Product Characterization
	ETH.MESH.01992236	"Form for Test Method Applicability/Suitability"
1/18/2008	ETH.MESH.00906445	Email from Vincenza Zaddem to Bryan Lisa re: 510(k) mesh data with strength
	ETH-01754	FDA letter stating necessary force for arm pull-out
12/15/2008	ETH.MESH.00067363	Email attaching Vincent Lucente Webinar Transcript
	ETH.MESH.02227368	Meshes/Devices Chart
	ETH.MESH.02212840	
	ETH.MESH.00081180	Prolift Characteristics
9/10/2007	ETH.MESH.021989933	Email From Christoph Walther to Vincenza Zaddem re: "Info needed for FDA"

8/29/2007	ETH.MESH.00080842	Letter from Dr. Jiyoung Dang to Bryan Lisa regarding Prolift & Prolift +M changes
9/12/2007	ETH.MESH.00922443	Email from Vincenza Zaddem to Price St. Hilaire et al. regarding bidirectional elasticity statement
6/18/2007	ETH.MESH.01405170	"Exploratory Program 'Thunder'" Powerpoint presentation By: Clifford Volpe and Peter Meier
5/9/2008	ETH.MESH.02227224	"MGPP Thunder Decision Meeting" powerpoint presentation
12/1/2006	ETH.MESH.02195798	Email from Axel Arnud re Strength
6/26/2008	ETH.MESH.02195788	Prolift +M DRM
3/7/2007	ETH.MESH.00078537	Email from Joerg Holste re: Lightning 510(k) requirements
10/26/2008	ETH.MESH.02207388	Email from Jonathan Meek to Julie Bird et al. re: Prolift +M Pre-Reading
2012	ETH.MESH.03753245	"Biomechanics (Pelvic Forces) PowerPoint
	ETH.MESH.00396836	"Review of Surgical Techniques using Mesh" by David Robinson
5/8/2008	ETH.MESH.00318775	Email from Mark Yale to Jennifer Paine, Jonathan Meek et al. re: Prolift mesh was "not specifically design".
2/16/2011	ETH.MESH.02010834	"Biomechanical consideration for Pelvic floor mesh design" by Juergen Trzewik and Christoph Vailhe
2006	ETH-00255	Ethicon Marketing Brochure
	ETH.MESH.00033325	Professional Education PowerPoint presentation titled "The Science of Augmented Extracorporeal Reconstructive Pelvic Surgery"
2006	ETH-47802	Cobb WS, Burns JM, Peindl RD, Carbonell AM, Matthews BD, Kercher KW, Heniford BT <i>Textile analysis of heavyweight, mid-weight, and lightweight polypropylene mesh in a porcine ventral hernia model</i> ..J Surg Res. 2006 Nov;136(1):1-7. Epub 2006 Sep 22.
7/13/2009	ETH.MESH.02011199	Email from Peter Meier to Jonathan Meek, Piet Hinoul et al. re TPO_TPP and the comparison of PVDF to PP
2009	ETH.MESH.01264260	Piet Hinoul Presentation
2004	ETH-65881	Gynecare Prolift IFU
2003	ETH.MESH.02053630	Gynemesh PS "White Paper"
1/23/2003	ETH-03883	"Prolene Resin Manufacturing Specifications" by John Karl
2/28/2005	ETH-03534	DDSA Appendix II Prolift "Summary Report"
2/28/2002	ETH-03558	DDSA Appendix VI "Form" describing hazards
7/20/2007	ETH.MESH.05920616	Email from Martin Chomiak to Boris Batke, et al. re Defining light weight mesh



	ETH.MESH.01816990	Kammerer Product development chart
	ETH.MESH.05479535	Microporous, Medium & Macroporous grid
3/13/2006	ETH.MESH.05446127	Email from Holste to Engel et al. re: Mesh and tissue contactation in animals
03/2011	ETH.MESH.05479718	"Ethicon Polypropylene Mesh Technology" Powerpoint by Boris Batke
4/17/2003	ETH.MESH.05920530	Email from Boris Batke to Jill Schiaparelli et al. re Literature list of Lightweight Meshes
2/2/2008	ETH.MESH.05920618	Email from Petra Koehler to Boris Batke, et al. re Dr. Schumpelick
3/1/2012	ETH.MESH.04015102	Email from Boris Batke to Casey Mayes re AWES Pelvic Floor Conference - Gala Dinner invitation
6/3/2012	ETH.MESH.05585066	"Ultrapro" PowerPoint presentation by Boris Batke
	ETH.MESH.05916450	"Chronic Pain Prevention/future - Bioengineer's point of view"
	ETH.MESH.04037600	"Innovations in Mesh Development" By Boris Batke
	ETH.MESH.05479410	"The (clinical) argument of lightweight mesh in abdominal surgery" presentation by Boris Batke
5/4/2004	ETH.MESH.05918776	Email from Jill Schiaparelli to Karen Zaderej, Boris Batke et al. re Marlex experience
1/13/2005	ETH.MESH.04036976	Dynamesh, Dynamesh Light, Dynamesh IPOM: Analysis of Competitor meshes: Report
	ETH.MESH.02219202	Material Specification for TVT Prolene Polypropylene Mesh Roll Stock
4/3/2009	ETH.MESH.02184435	Email from Osman Rathore to Meng Deng et al. re Analytical characterization - Optimization of Structure
3/1/2012	ETH.MESH.07226377	Email from Laura Vellucci to Dennis Jamiolkowski re Polypropylene mesh
2/29/2012	ETH.MESH.04038180	Email from Dennis Jamiolkowski to Laura Vellucci et al. re Your Professional Opinion
3/5/2012	ETH.MESH.04937874	Email from Piet Hinoul to Laura Vellecci et al. re Polypropylene mesh
3/6/2012	ETH.MESH.07212397	Response to email from Clare Huntington 26 January 2012 (15:38) with attached publication: <i>"Polypropylene as a reinforcement in pelvic surgery is not inert: comparative analysis of 100 explants", Int Urogynecol J (2010) 21:261-270</i>

3/12/2012	ETH.MESH.07205370	Response to email from Clare Huntington 26 January 2012 (15:38) with attached publication: <i>"Polypropylene as a reinforcement in pelvic surgery is not inert: comparative analysis of 100 explants"</i> , <i>Int Urogynecol J</i> (2010) 21:261-270
3/7/2012	ETH.MESH.07226404	Email from Dennis Jamiolkowski to Laura Vellucci et al. re Information on PROLENE Suture and PROLENE Mesh
04/2008	ETH.MESH.00006636	Klosterhalfen B., Interim Report Mesh Explants Pelvic Floor Repair
	ETH.MESH.07726805	Burkley notes on Dr. Klinge Prolift expert report
10/15/1992	ETH.MESH.05453719	Seven Year Data for Ten Year Prolene Study: ERF 85-219
12/14/2010	ETH.MESH.02588977	ERM team Meeting Minutes
	ETH.MESH.03699547	PA Consulting Cost
5/18/2011	ETH.MESH.02589032	PA Consulting "Investigating Mesh Erosion in Pelvic Floor Repair" Draft
3/31/2011	ETH.MESH.07198250	Email Christophe Vailhe to Joe Robinson re: Thanks & pictures
7/3/2002	ETH.MESH.02183537	Porosity Measurements of Various Meshes by D.F. Burkley
2/17/2010	ETH.MESH.05443495	Porosity Measurements of Various Meshes by D.F. Burkley
	ETH.MESH.05443059	Operating Procedure for Optical Evaluation to Determine Porosity of Mesh Samples Using the Nikon Stereomicroscope and Image-Pro Image Analysis System
	ETH.MESH.05443077	AST-2010-0587 "Pore Size Measurement of Surgical Mesh Products"
1/2/2006	ETH.MESH.00585906	Email from Gene Kammerer to Sunny Rha re TVT - TVT-O Specifications
11/14/2007	ETH.MESH.02212596	"Mesh Testing" Powerpoint presentation By Elizabeth Vailhe
2005	ETH.MESH.01424029	Cobb W, Kercher K, Heniford T. <i>The Argument for Lightweight Polypropylene Mesh in Hernia Repair</i> . Surgical Innovation. 2005; 12(1):T1-T7
	ETH.MESH.00528626	Product Quality Plan for Gynecare Gynemesh XL
4/25/2002	ETH.MESH.01808729	Corporate Product Characterization: Product Performance Evaluation Group; "Transfer of Finishing Operations for 6-mil Old Constructions Clea and 50% Blue PROLENE Mesh from ETHICON-Cornelia to PRODESCO, Inc"

	ETH.MESH.05918082	"Solving the Device Design Puzzle" Powerpoint
3/19/2003	ETH.MESH.01218446	Corporate Product Characterization: Product Performance Evaluation Group; "Validation for Knitting, Scouring and Heat Setting 6-mil Old Construction Blue PROLENE Mesh at Secant Medical"
4/7/2004	ETH.MESH.07190442	Memo to Josh Samon from Michael Pelekis re Risk Assessment for Laser Cutting of D'art Gynemesh PS Implants
8/26/2011	ETH.MESH.06261965	Email from John Karl to Bob Washington et al. re: Braskem.....A Little History
2/3/2003	ETH.MESH.02268613	Email from Daniel Burkley to Dorothy Dion et al. re Athos: Analytical Testing
2/21/2003	ETH.MESH.02268618	Email from Dorothy Dion to Scott Ciarrocca re ATHOS: PROLENE Additive and Exposure
4/27/2005	ETH.MESH.03908707	Email from Paula Evans to Gynecare Marketing & Gynecare Umbrella re PROLENE vs. polypropylene
3/9/2006	ETH.MESH.00750766	Interim Report, PSE Accession NO: 05-0070 "Test and Control Article Material Characterization Program" with TVT-Secur Implant and EO Sterilization
4/27/2010	ETH.MESH.02185004	Email from James Flint to Elizabeth Vailhe re surface area
	ETH.MESH.09479067	TVT PROLENE Polypropylene Mesh Rool Stock Appendix II Digital Photograph of 050166
2/16/2011	ETH.MESH.03146492	Email from Joerg Holste to Judi Gauld et al. re Prosima +M clin stra
3/13/2006	ETH.MESH.05446127	Email from Joerg Holste to Dieter Engel re Mesh and Tissue Contraction in Animal
	ETH.MESH.00838428	"Characteristics of Synthetic Materials Used in Prolapse and Incontinence Surgery" powerpoint presentation By A. Arnaud & D. Robinson
10/2/2003	ETH.MESH.05483362	"ULTRAPRO Mesh Pricing Committee Presentation"
9/25/2012	ETH.MESH.08315779	Piet Hinoul Clinical Expert Report Gynecare Prolift +M Pelvic Floor Repair System
11/2004	ETH.MESH.00659678	The TVM Group, "Conceptual advances in the surgical management of genital prolapse" article
	ETH.MESH.05718952	Project Edelweiss Characteristics grid
3/11/2005	ETH.MESH.05549189	Email from Joerg Holste to Sandy Savidge re Infection Risk implantation TVT-U
	ETH.MESH.05505944	Clinical Infection Risk Assessment for Gynecare TVT Universal (TVT U)

12/21/2004	ETH.MESH.05245392	Email from Joerg Holste to Steve Bell et al. re TVT - Next Generation Questionstion
6/2/2005	ETH.MESH.06403725	Final Report: Ethicon Study No. SOD4/2-2-1: A 3 month pre-clinical trial to assess the fixation force of a new TVT (TVTx) in the sheep model
1/3/2006	ETH.MESH.05246116	Email from Dan Smith to Allison London Brown et al. re Results of TVTx preclinical trial
	ETH.MESH.00840056	TVT - Secur PPT
2/28/2006	ETH.MESH.04939027	Corporate Prodcut Characterization Plan for Gynecare TVT S (Secur)
11/28/2005	ETH.MESH.00019925	Letter to Patrica Hojnoski from FDA re Gynecare TVT Secure System
7/16/2010	ETH.MESH.04940233	Preclinical Efficacy Assessment for ETHICON GYNECARE GYNEMESH M
1/20/2010	ETH.MESH.05127423	Email from Joerg Holste to Petra Koehler and Axel Arnaud re Tissue reaction ULTRAPRO
1/9/2012	ETH.MESH.08579092	Email From Christophe Vailhe to Clifford Volpe et al. Re Mesh Exposure - Ethicon Position - Short List
2/1/2012	ETH.MESH.07200381	Email from Christophe Vailhe to Clifford Volpe Re Exposure Position Norderstedt 2012.pptx
2/2/2012	ETH.MESH.07200382	"Mesh Exposure Ethicon Position" Powerpoint presentation
3/5/2012	ETH.MESH.04548236	CDMA Meeting Minutes -2012
11/1/2010	ETH.MESH.07192033	Letter to Michael Richter from PA Consulting re "Investigation into mesh erosion in pelvic floor repair"
2/17/2011	ETH.MESH.07192242	Email from Peter Meier to Julie Bird et al., Re Sales reps in UK
7/21/2011	ETH.MESH.07198825	Email from Christophe Vailhe to Ian Rhodes at PA Consulting re Mesh erosion report attached
1/20/2011	ETH.MESH.07192012	PA Consulting Group - Mesh Erosion Interview - Surgeon (Rhona Kearney)
1/18/2011	ETH.MESH.07192412	PA Consulting Group - Mesh Erosion Interview - Pathology (Klosterhalfen)
1/14/2005	ETH-07152	Clinical Expert Report: GYNECARE PROLIFT Pelvic Floor Repair System by Charlotte Owens
2/9/2011	ETH.MESH.07197998	Email from Christophe Vailhe to Michael Richter et al. Re: You have been selected - Forces on the pelvic floor - challenge to determine
5/18/2011	ETH.MESH.07192872	Email from Piet Hinoul to Pann Hermansson and Christophe Vailhe Re Forces in the pelvic floor
2/16/2011	ETH.MESH.02185584	Biomechanical consideration for Pelvic floor mesh design

1/16/2012	ETH.MESH.07200224	Email from Christophe Vailhe to Juergon Trzewik re Biomechanics of the pelvic floor
	ETH.MESH.07876572	TVT Secure 510(k)
	ETH.MESH.01217925	An exploratory 91-Day Tissue Reaction Study of Polypropylene Based Surgical Mesh in Parts (PSE ACC. NO. 00-0035)
8/8/2006	ETH.MESH.02091873	Holste & Barbolt signed ISO 10993 testing documents
2/27/2004	ETH.MESH.00863391	Email from Dan Smith to Janice Burns re Important: 2 TVT complaints concerning allegedly brittle mesh
11/10/2004	ETH.MESH.02180828	Letter from Dr. Eberhard
10/18/2004	ETH.MESH.02180833	Translation of Dr. Eberhard letter
10/12/2005	ETH.MESH.03535750	Letter to Herve Fournier RE 810041B TVT Device, Blue Mesh - complaint
2/15/2006	ETH.MESH.00584291	Email from Jacqueline Flatow to Sungyoon Rha et al. Re Dver protocol for particle loss
5/1/2006	ETH.MESH.03358217	Email from Gene Kammerer to Herve Fourier re French Standard on TVT & Meshes
5/4/2006	ETH.MESH.01221024	Email from Gene Kammerer to Herve Fournier et al. Re: New Standards for Urethral Slings
5/9/2006	ETH.MESH.01219629	Email from Jacqueline Flatow to Gene Kammerer re Particle loss on TVT
6/6/2006	ETH.MESH.00584488	Email from Herve Fournier to Gene Kammerer et al., Re: New Standards for Urethral Slings
8/31/2007	ETH.MESH.00844331	Email from David Robinson to Yukie Yamano et al. Re: Asking TVT Complication? - Fraying
8/31/2007	ETH.MESH.00844341	Email from David Robinson to Thomas Barbolt Re: Asking TVT Complications? - Fraying
6/18/1999	ETH.MESH.05315240	A 28-Day Intramuscular Tissue Reaction Study in Rats of Polypropylene Mesh from the TVT (Ulmsten) Device (PSE ACCESSION NO. 97-0197)
7/19/1996	ETH.MESH.04447134	Corporate Product Characterization - Product Safety Profile (Prolene)
10/1/1997	ETH.MESH.08218336	Biocompatibility Risk Assessment for PROLENE Polypropylene Mesh
10/1/1997	ETH.MESH.08218337	Literature Review on Biocompatibility of Prolene Sutures and Implants
	ETH.MESH.02134271	Mechanisms of Cytotoxicity for TVT Polypropylene Mesh (DRAFT)
3/5/2003	ETH.MESH.05316755	Histological Evaluation and Comparison of Mechanical Pull Out Strength of Prolene Mesh and Prolene Soft Mesh in A Rabbit Model



8/8/2005	ETH.MESH.07876890	Examination of an Extract of TVT-Secur Implant ETO Steril, Implantat for Cytotoxix Properties in a Cell Culture Test
8/8/2005	ETH.MESH.07876905	Intracutaneous Test of an Extract of TVT Secur Implant ETO Steril Implantat in Rabbits
8/8/2005	ETH.MESH.07876870	Examination of an Eluate of TVT-Secur Implant ETO Steil, Implanat of Pyrogenic Properties in Rabbits
	ETH.MESH.07876820	K052401: Response to FDA's Request for Additional Information: Gynecare TVT Secur System
1/28/1998	ETH.MESH.00371496	Letter to Gregory Jones from FDA re Tension Free Vaginal Tape (TVT) System
11/2/2001	ETH.MESH.07469275	Biocompatibility Risk Assessment for TVT-AA - Revised
12/8/2003	ETH.MESH.00019863	TVT-O 510(k)
2/8/2006	ETH.MESH.00874032	Email from Mark Yale to Cindy Crosby et al. Re: MHRA Request - TVT (change to dying process)
6/6/2001	ETH.MESH.01159961	Biocompatibility Risk Assessment for the TVT-L Device
8/27/2008	ETH.MESH.06851860	Gynecare TVT AA - CE Mark Technical File
	ETH.MESH.02026591	Sunoco MSDS
7/9/1992	ETH.MESH.09557798	7 Year Dog Study with explant images
3/30/2012	ETH.MESH.03949361	Dyed Prolene Batch Review
10/1/1992	ETH.MESH.09557819	Handwritten notes from 7 year dog study
	ETH.MESH.00339437	5 years Sales Piece - TVT
	ETH.MESH.09671620	Weights, elasticity etc chart
	ETH.MESH.09651393	Invention disclosure
	ETH.MESH.09654601	Uniaxial Test- theoretical considerations
	ETH.MESH.03032928	FDA Review - R&D
	ETH.MESH.02995494	"Evidence to Support Innovation" PowerPoint presentation by Judi Gauld
12/21/2007	ETH.MESH.02588170	Slide from Trzewik presentation
6/6/2000	ETH.MESH.03924557	"Meshes in Pelvic Floor Repair" By Brigitte Hellhammer
	ETH.MESH.03658980	TVT-PA 510 (k)
7/9/2007	ETH.MESH.05588123	Email from Stephen Wolhert to Brigitte Hellhammer et al. re Costello Article
2008-2010	ETH.MESH.02340504	Gynecare TVT IFU
2006	ETH.MESH.00584491	Email re AFNOR standards
2010-Present	ETH.MESH.03427878	TVT IFU
2006-2008	ETH.MESH.05222673	TVT IFU
2005-2006	ETH.MESH.02340471	TVT IFU
2003-2005	ETH.MESH.02340306	TVT IFU

2001-	ETH.MESH.05225354	TVT IFU
	ETH.MESH.02340568	TVT-S IFU
	ETH.MESH.02340902	TVT-O IFU
	ETH-10187	Prolift Patient Brochure
	ETH.MESH.00748451	Prolif & Prolift +M 510
	ETH.MESH.02341954	Prolift & Prolift +M Patient Brochure
	ETH.MESH.00006796	Stand and Deliver PowerPoint Presentation
	ETH.MESH.04941016	Lightweight Mesh Development PowerPoint by Juergen Trzewik
7/6/2007	ETH.MESH.05447475	Email from Dieter Engel to John Gillespie et al. re How inert is polypropylene?
	ETH.MESH.05237872	"Mesh Properties - How Important are they?" by Peter Meier
1999	ETH.MESH.05644163	Pelvic Floor Repair – Surgeon’s Feedback on Mesh Concept
8/4/2009	ETH.MESH.04066979	Email re Dynamesh in Brazil
6/23/1998	ETH.MESH.09266657	Email from Larry Ellington re Prolene Mesh for TVT
	ETH.MESH.05225380	TVT IFU
	ETH.MESH.02340331	TVT IFU
	ETH.MESH.03427878	TVT IFU
2007	ETH.MESH.06861473	Gynecare TVT Secure Competitive Product Update PowerPoint presentation
7/12/2000	ETH.MESH.01317515	Preventia document
8/21/2000	ETH.MESH.03909708	Email from Axel Arnaud re Pelvic Floor Repair Procedural Strategy
10/2000	ETH.MESH.04044797	TVT Update: Success & Complications (Causes and recommendations)
6/22/2001	ETH.MESH.02089392	Scientific Advisory Panel on Pelvic Floor Repair - Preliminary Minutes
4/25/2002	ETH.MESH.01317510	Device Design Safety Assessment (DDSA) Re-Evaluation for TVT
12/2/2005	ETH.MESH.04385229	Clinical Expert Report - Gynecare TVT Secur System
1/29/2009	ETH.MESH.04093125	Email from Meng Chen re TVT IFUs on tape extrusion, exposure and erosion
	ETH.MESH.04081189	Meeting agenda
12/17/2008	ETH.MESH.00772231	Email from Robin Osman re Updated Fair Balance for TVT Brochure
12/17/2008	ETH.MESH.00772228	Email from Robin Osman re 2008 Budget Spend
12/18/2008	ETH.MESH.00339083	Email from Bryan Lisa re TVT Patient Brochure Fair Balance/EPI changes
3/2/2004	ETH.MESH.00865322	Email from Charlotte Owens re Reminder on BLUE mesh!

3/9/2004	ETH.MESH.00863405	Email from Brian Luscombe re Complaint TVTO
	ETH.MESH.01805985	"The Mesh Story" PowerPoint presentation by Dan Smith
11/10/2009	ETH.MESH.06921060	Email from Joseph Lanza re Preread for Web Conference
	ETH.MESH.06696593	Design FMEA TVT LCM Project
	ETH.MESH.06856958	"Gynecare TVT Obturator System" PowerPoint Presentation
10/13/2002	ETH.MESH.03910183	Email from Axel Arnaud re Soft Prolene
6/6/2001	ETH.MESH.03905472	Email from Martin Weisberg re TVT recommendation from Dr. Alex Wang
2/27/2004	ETH.MESH.00863391	Email from Dan Smith re Important: 2 TVT Complaints concerning allegedly brittle mesh
11/10/2004	ETH.MESH.02180828	Dr. Eberhard Compliant
10/18/2004	ETH.MESH.02180833	Translation of Dr. Eberhard letter
5/9/2006	ETH.MESH.00585802	Email from Gene Kammerer re Particle Loss on TVT
6/12/2006	ETH.MESH.00585842	Email from Gene Kammerer re TVT LCM - particle loss (reimbursement submission)
	ETH.MESH.03932912	The History of TVT
	ETH.MESH.06859904	"TVT: Insights into the Making of a Revolution" by Sheri Dodd
11/7/2005	ETH.MESH.05220458	Email from Wanda Petire-Singer re TVT Records
	ETH.MESH.03714599	Unsigned Clinical Expert Report Gynecare TVT Secur System
9/15/2005	ETH.MESH.03905619	Email from Martin Weisberg re clinical expert report
11/18/2003	ETH.MESH.00541379	"Mesh fraying for TVT Devices" memo
10/21/2008	ETH.MESH.02310653	Email from Sandy Pompilio re Information about FDA notification on use of mesh in pelvic surgery
12/10/2004	ETH.MESH.01811770	Email from Steve Bell re VOC on Laser Cut Mesh
	ETH.MESH.06857406	"TVT-Bridge) Retaining Leadership" PPT
	ETH.MESH.01265223	Risk Managent Report (legacy) for TVT and TVT-O
	ETH.MESH.00070187	Company Procedure for Medical Device Risk Management Plan
11/29/2004	ETH.MESH.01811758	Email from Paul Parisi re TVT Laser Cut mesh business case (for meeting this afternoon)
1/18/2011	ETH.MESH.08474562	2010 Performance and Development Plan Summary for Daniel Smith
	ETH.MESH.01816988	Mesh Timeline
	ETH.MESH.00838428	"Characteristics of Synthetic Materials Used in Prolapse and Incontinence Surgery" powerpoint presentation By A. Arnaud & D. Robinson

		Section of Ethicon Powerpoint showing Weights
04/2008	ETH.MESH.06867612	"Matrix Material" PowerPoint Presentation
2002	ETH.MESH.06894461	Klinge, U., Klosterhalfen, B., Birkenhauser, V., Junge, K., Conze, J., Schumpelick, V. <i>Impact of Polymer Pore Size on the Interface Scar Formation in a Rat Model</i> . Journal of Surgiccal Research. 103, 208-214 (2002)
	ETH.MESH.06893952	"Evaluation of UltraPro Meshes" PowerPoint Presentation
11/26/2002	ETH.MESH.03910418	Email from Axel Arnaud re Mini TVT - mesh adjustment
1/16/2007	ETH.MESH.06868377	Email from Reinhard Juraschek re shrinkage review
3/4/2008	ETH.MESH.08474542	2007 Performance and Development Plan Summary for Daniel Smith
2/28/2003	ETH.MESH.01222617	Histological Evaluation and Comparison of Mechanical Pull Out Strength of Prolene Mesh and Prolene Soft Mesh in A Rabbit Model
	ETH.MESH.06923868	TVTO-PA Clinical Strategy
1/20/2012	ETH.MESH.08474570	2011 Performance and Development Plan Summary for Daniel Smith
3/8/2009	ETH.MESH.08474547	2008 Performance and Development Plan Summary for Daniel Smith
1/25/2010	ETH.MESH.08474555	2009 Performance and Development Plan Summary for Daniel Smith
9/13/2010	ETH.MESH.06917699	Form for Customer Requirements Specification (CRS) For Project TVT-O PA
08/2010	ETH.MESH.02218268	"TOPA & SCION PA Alignment" PowerPoint Presentation
11/1/2004	ETH.MESH.05548122	Email from Dan Smith re Update from the Oct 27 cadaver
12/14/2004	ETH.MESH.01809080	Comparison of Laser-Cut and Machine-Cut TVT Mesh to Meshes from Competitive Devices (BE-2004-1641)
6/18/2008	ETH.MESH.04048515	Meeting minutes re Project Scion
	ETH.MESH.01228079	Nilsson Podcast Transcript
	ETH.MESH.02227368	Meshes/Devices Chart
	ETH.MESH.02219202	Material Specification for TVT Prolene Polypropylene Mesh Roll Stock
9/25/2012	ETH.MESH.08315779	Piet Hinoul Clinical Expert Report Gynecare Prolift +M Pelvic Floor Repair System
1996	ETH.MESH.05795664	Ulmsten, U., et. Al. <i>An Ambulatory Surgical Procedure Under Local Anesthesia for Treatment of Female Urinary Incontinence</i>
	ETH.MESH.05972834	Asset Purchase Agreement

	ETH.MESH.08477464	Company Procedure for the Ethicon Product Development Process (PDP)
	ETH.MESH.03742864	Operating Procedure for Failure Modes and Effects Analysis Application (AFMEA) or Design (dFMEA)
	ETH.MESH.03742571	Company Procedure for Medical Device Risk Management Plan
	ETH.MESH.01268264	Risk Managent Report (legacy) for TVT and TVT-O
	ETH.MESH.03652924	Form for Internal Audit Corrective Action Plan
2/24/2006	ETH.MESH.00302105	Memo re TVT Laser Cut Mesh (LCM) Risk Analysis Summary
	ETH.MESH.01310061	Risk Management report TVT Laser Cut Mesh (LCM)
	ETH.MESH.01310476	Risk Management report TVT Laser Cut Mesh (LCM)
1/29/2009	ETH.MESH.06858146	Email from Dan Smith re TVT-O resin Minute Jan 31th
	ETH.MESH.06858314	Test Method for the Thickness of Mesh
	ETH.MESH.08438961	Work instructions for Device Design Risk Management
2/14/2003	ETH.MESH.06873447	Due Diligence Growth Opportunity Outline
3/4/2003	ETH.MESH.00858094	Gynecare R&D Monthly Update - March
	ETH.MESH.00858092	Gynecare R&D Monthly Update - June
6/24/2003	ETH.MESH.02180737	Email from Ronnie Toddywala re Project Mulberry
	ETH.MESH.03932909	History of TVT-O
	ETH.MESH.00857891	"Top Ten Reason To Pursue....Gynecare TVT Obturator System" PowerPoint Presentation by Brian Luscombe
	ETH.MESH.00858891	TVT proejects charting document
1/22/2004	ETH.MESH.00857821	Gyecare TVT Obturator System Sales Training Launch Meeting
8/8/2003	ETH.MESH.03803462	Email from Laura Angelini re Transient Leg Pain with Mulberry
12/19/2003	ETH.MESH.00259473	TVT-O DDSA
3/29/2004	ETH.MESH.02180759	Letter from Jean de Leval
7/24/2003	ETH.MESH.00864101	Email from Dan Smith re TOVT development
8/8/2007	ETH.MESH.06861426	Email from Julie Hocknell re Adventures with TVT Secur
8/15/2003	ETH.MESH.00864131	Email from Brian Luscombe re Aug 11 program
	ETH.MESH.03926030	Meeting minutes re Project Scion
	ETH.MESH.00858096	Gynecare R&D Monthly Update - May
5/29/2003	ETH.MESH.00260020	Study Grid



6/17/2003	ETH.MESH.01815611	Email from Dan Smith re Discussion 11th June 2003
6/3/2003	ETH.MESH.00858175	Mulberry Weekly Meeting Minutes
1/16/2004	ETH.MESH.06164409	Email from Dan Smith re Dedication
2010	ETH.MESH.06260647	R&D CO-OP Welcome Guide Spring 2010
	ETH.MESH.01316727	Design History 1 book 1999 - TVT 5mm version
	ETH.MESH.01317508	Design History 1 book 1998 - TVT factbook
		TVT Classic IFU Revision Project Design
11/19/2010	ETH.MESH.00748213	Requirements Waiver Rationale Memo
	ETH.MESH.00858636	TVT Secur lessons learned review
		Corporate Product Characterization plan for
7/18/2005	ETH.MESH.04939148	Gynecare TVT S (Secur)
	ETH.MESH.01150009	Gynecare TVT Secur Presentation by Dan Smith
2007	ETH.MESH.06861473	Gynecare TVT Secur Competitive Product Update
	ETH.MESH.06860553	TVT & TVT Secur Documents
		Company Procedure for the Ethicon Product (PDP) -
	ETH.MESH.04316544	Design Controls
		Company Procedure for Design Changes to Existing
	ETH.MESH.00363605	Products
		Operating Procedure for Failure Modes and Effects
	ETH.MESH.05432198	Analysis Application (AFMEA) or Design (dFMEA)
10/7/2004	ETH.MESH.05456924	Email from Dan Smith to TVTx - Next Generation
11/22/2004	ETH.MESH.00259042	TVT "Project Initiation"
		2004 Strategy Tree Project Definition
	ETH.MESH.01217673	TVT-NEXT (TVTx) Development contract
		Email from Raimo Sump re TVT Secur Minutes -
4/25/2005	ETH.MESH.06274935	Team Meeting April 12 2005
	ETH.MESH.01410044	Gynecare TVT Secur Product Specs and changes
	ETH.MESH.05554367	Finger Pad Detail Drawings
	ETH.MESH.04385192	Gynecare TVT Secur Product Specs and changes
	ETH.MESH.05502894	Design Requirements Matrix - TVT S
	ETH.MESH.01592178	Design Validation Report - TVT S
	ETH.MESH.07876572	TVT Secure 510(k)
	ETH.MESH.02135955	Design Validation Report - TVT S
10/29/2007	ETH.MESH.00642325	Email from Kevin Mahar re TVT O versus TVT
7/28/2004	ETH.MESH.06869750	Secur efficacy and safety rate
		Human Cadaver Wetlab
		A 3 month pre-clinical trial to assess the fixation
2/8/2005	ETH.MESH.01037530	force of a new TVT (TVTx) in the sheep model -
		Ethicon's Final Report
		A 3 month pre-clinical trial to assess the fixation
2005	ETH.MESH.00034720	force of a new TVT (TVTx) in the sheep model -
		Published article

10/27/2004	ETH.MESH.05537701	Email from Walter Artibani re Results of TVTx preclinical trial
8/23/2005	ETH.MESH.00749504	Final Report, PSE Accession Number 05-0395, Project Number 67379: Evaluation of fixation force for the Gynecare TVT Secur Device in a sheep cadaver pelvic floor model
8/23/2005	ETH.MESH.00749518	Final Report, PSE Accession Number 05-0396, Project Number 67379: Evaluation of the Pullout Force of Gynecare TVT Secur implanted into the urogenital diaphragm and obturator membrane of a human cadaver
12/2/2005	ETH.MESH.03714002	Clinical Expert Report - Gynecare TVT Secur System
	ETH.MESH.00853802	Medical device risk management/company procedure for Medical Device Risk Management Plan: PR602-003
	ETH.MESH.00538202	A Pilot Study of the Gynecare TVT Secur System for Treatment of Stress Urinary Incontinence
11/21/2005	ETH.MESH.00752863	Gynecare TVT Secur - Manufacture and subsequent operations of the Inserter Body
11/22/2005	ETH.MESH.03648795	Gynecare TVT Secur - Inserter Assembly Welded
6/6/2006	ETH.MESH.0109412	Process at Ethicon Sarl and Ethicon BmbH for the TVT Secur System
5/18/2006	ETH.MESH.0554680	Email from Risa Cantimbuhan re Design Transfer checklist discussion
	ETH.MESH.05534022	aFMEA for TVT Secur - CO-0011927 change
	ETH.MESH.00823549	aFMEA for TVT Secur - Additional Change
	ETH.MESH.05534...	Design GMEA for TVT Secur, Version 1, FMEA-00002680
	ETH.MESH.01407837	PFMEA-100152
	ETH.MESH.00752921	Risk Management Report TVT Secur Revision A
	ETH.MESH.00752928	Risk Management Report TVT Secur Revision B
	ETH.MESH.00752933	TVT Secur Harms/Hazards table Version A
	ETH.MESH.05534013	Risk Management Report: TVT Secur
6/20/2003	ETH.MESH.01814371	Email from Katrin Elbert re Design Control
	ETH.MESH.01814384	Work Instruction for New Product Design Control
3/16/2004	ETH.MESH.03364540	Email from Dan Smith re TVTO training Carmel Ramage
8/18/2004	ETH.MESH.06884516	Email from Kevin Mahar re Dr. Jensen Follow up
6/2/2003	ETH.MESH.00862727	Email from Dan Smith re My notes from the Thursday evening presentation 5/22/03 and Friday's surgery
6/22/2004	ETH.MESH.06881589	Email from Janice Burns re Gynecare TVT Oburator Global Launch Update - Issue 4

8/17/2004	ETH.MESH.01815505	Email from Janice Burns re TVTO Dr. Feagins case follow up
9/8/2004	ETH.MESH.06884726	Email from Shannon Campbell re Ongoing TVT-O Action Items
9/14/2004	ETH.MESH.00864493	Email from Dan Smith re Ongoing TVT-O Action Items
8/17/2004	ETH.MESH.06881576	Email from Janice Burns re TVTO
5/5/2004	ETH.MESH.00864407	Email from Dan Smith re TVT-O
2/19/2004	ETH.MESH.06892171	Email from Dan Smith re TVT-O recognition Submission JANICE FOR YOUR COMMENTS!!!!!!!
9/8/2004	ETH.MESH.00864490	Email from Dan Smith re Ongoing TVT-O Action Items
2/20/2003	ETH.MESH.03911107	Email from Axel Arnaud re TVT complications (an Prof. Hausler)
7/21/2004	ETH.MESH.03910799	Email from Axel Arnaud re TVT Erosions?
11/28/1999	ETH.MESH.03917309	Email from Rodrigo Bianchi re TVT event
1/31/2006	ETH.MESH.03911712	Email from Axel Arnaud re TVT - TVT-O Specifications
6/6/2003	ETH.MESH.03907853	Email from Laure Le Treguilly re TVT - Serious Complication
	ETH.MESH.03907468	Second Generation TVT
	ETH.MESH.03907327	Trans-obturator TVT - Procedure In-Out Pr J. de Leval (University of Liege, Belgium)
5/25/2003	ETH.MESH.03910890	Email from Axel Arnaud re Follow up Mulberry
6/9/2003	ETH.MESH.00261584	Email from Sean O'Bryan re Mulberry stage gate action item closed
8/14/2003	ETH.MESH.03911390	Email from Axel Arnaud re Transient leg pain with Mulberry
1/7/2009	ETH.MESH.01202101	Email from Aaron Kirkemo re My revised writeup of the DeLeval and Waltregny visit
2/20/2006	ETH.MESH.03938897	Email from Xavier Buchon re Pr Cosson
3/26/2003	ETH.MESH.03919404	Email from Axel Arnaud re Mulberry
6/1/2009	ETH.MESH.00860142	Email from Dan Smith re Sample Medio TVTO
	ETH.MESH.02340568	TVT-S IFU
1999	ETH.MESH.04193990	Major Executive Committee Actions
	ETH.MESH.00826057	"Gynecare TVT Secur Project Overview"
11/30/2006	ETH.MESH.03921612	Email from Ralf Felix Gotter re The more procedures the more problems
12/5/2006	ETH.MESH.03921580	Email from Dan Smith re TVT-Secur follow up conference call last week
12/15/2006	ETH.MESH.01770534	Email from Axel Arnaud re TVT-S Cookbooks
	ETH.MESH.01770535	"TVT-Secur: 'Hammock' Position"
	ETH.MESH.01770541	"TVT-Secur: 'U' Position"

12/19/2006	ETH.MESH.01000731	Email from David Robinson re TVT-S Cookbooks
12/19/2006	ETH.MESH.00519476	Email from Dan Smith re TVT-S Cookbooks
12/19/2006	ETH.MESH.03921499	Email from David Robinson re TVT Secur
12/20/2006	ETH.MESH.01784428	Email from David Robinson re TVT-S Cookbooks
1/8/2007	ETH.MESH.03912639	Email from Axel Arnaud re TVT Cookbooks
	ETH.MESH.03912647	Document re TVT procedure
1/9/2007	ETH.MESH.04204341	Email from Harel Gadot re report from Austria
	ETH.MESH.04204343	Women's Health - Monthly Report December 06
1/10/2007	ETH.MESH.03922966	Email from David Robinson re Report from Austria
1/16/2007	ETH.MESH.03922950	Email from David Robinson re TVT Secur procedural steps
3/9/2007	ETH.MESH.01000323	Email from Dan Smith re DRAFT of the latest "cookbook" after my trip to Germany
	ETH.MESH.01000449	Gynecare TVT Secur System Key Technical Points (Procedural Pearls)
5/4/2007	ETH.MESH.00163952	Gynecare TVT Secur System Key Technical Points
5/22/2007	ETH.MESH.00527832	Email from Dan Smith re TVT SECUR EU Experts Meeting - feedback & future actions
	ETH.MESH.00158289	TVT Secur Patient Brochure
1/16/2007	ETH.MESH.03922953	Email from Xavier Buchon re French data on TVT Secur
6/6/2007	ETH.MESH.03922405	Email from Andrew Beveridge re TVT Secur & NICE
10/3/2007	ETH.MESH.03922261	Email from Andrew Beveridge re AMS mini arc
11/15/1999	ETH.MESH.06692673	Ulmsten & Ethicon Consulting Agreement
10/17/1997	ETH.MESH.08476335	Scandinavian Multicenter Study of the tension free vaginal tape procedure
1998	ETH.MESH.00145084	International Urogynecology Journal and Pelvic Floor Dysfunction: Ulmsten "A Multicenter Study of Tension-Free Vaginal Tape (TVT) for Surgical Treatment of Stress Urinary Incontinence"
2001	ETH.MESH.00658806	Nilsson: Long-term Results of the Tension-Free Vaginal Tape (TVT) Procedure for Surgical Treatment of Female Stress Urinary Incontinence
2004	ETH.MESH.03930120	Nilsson study: Seven-Year Follow-Up of the Tension-Free Vaginal tape Procedure for Treatment of Urinary Incontinence
2008	ETH.MESH.00355003	Nilsson Study: Eleven Years prospective follow-up of the tension-free vaginal tape procedure for treatment of stress urinary incontinence
	ETH.MESH.00339437	TVT brochure
	ETH.MESH.01186068	Sales Aid
	ETH.MESH.08148403	Goretzlehner, U., Mollen, A. <i>PVDF as an implant material in urogynaecology.</i>

	ETH.MESH.PM.000004	TVT Retropubic Implantation video
4/23/2001	ETH.MESH.05642489	Email from Mark Sumeray to Greg Jones et al re Vypro Pelvic Floor Repair PD 00/3
2006	ETH.MESH.05457602	2006 Johnson Medal Nomination: Ultrapro Lightweight mesh product line
2002	ETH.MESH.02232930	Klinge, U., Klosterhalfen, B., Birkenhauser, V., Junge, K., Conze, J., Schumpelick, V. Impact of Polymer Pore Size on the Interface Scar Formation in a Rat Model. Journal of Surgiccal Research. 103, 208-214 (2002)
4/18/2005	ETH.MESH.04945496	Email from Klosterhalfen to Holste re Ultrapro vs. Prolene Soft Mesh
	ETH.MESH.05495419	Shrinking Meshes?
10/6/2006	ETH.MESH.09651966	Lighning PowerPoint presentation by Peter Meier
8/25/2008	ETH.MESH.03021946	T-Pro (Thunder) Pipeline Leadership Team (PLT) PowerPoint Presentation
12/12/2006	ETH.MESH.08168728	State of the knowledge of "mesh shrinkage" - What do we know?
	ETH.MESH.05489861	Sponsored Research Contract the Curators of the University of Missouri
10/1/1997	ETH.MESH.08218336	Biocompatibility Risk Assessment for Prolene Polypropylene Mesh
1/13/2010	ETH.MESH.09653077	Ethicon R&D Seminar Series meeting minutes
7/1/2006	ETH.MESH.09671612	Email from Juergen Trzewik to Peter Meier re Netzdiskussion
5/1/2008	ETH.MESH.08385338	Technical Memo Project Nuvance
	ETH-00295	Gynecare Prolift IFU
	ETH.MESH.02342194	Gynecare Gynemesh PS IFU
8/5/2009	ETH.MESH.09655947	Email from Juergen Trzewik re def. Stress Shielding
	ETH.MESH.09645766	When the Implant Worries the Body presentation
	ETH.MESH.02588182	Exploratory Program "Thunder" presentation by Trzewik and Meier
1/8/2009	ETH.MESH.09656632	Biomechanical consideration presentation
	ETH.MESH.09652185	Today's vaginal implants do not consider the patients' biomechanical needs
8/1/2006	ETH.MESH.05454207	Email from Juergen Trzewik to Peter Meier re fotos cadevar lab
6/21/2011	ETH.MESH.05718101	Email from Konrad Schmitt to Boris Batke et al. re Classification of Meshes - UPDATE
4/13/2011	ETH.MESH.09656790	Email from Juergen Trzewik to Stale Kvitle et al re laser cutting
1998	ETH.MESH.09264884	Long term goals
1998	ETH.MESH.10183005	Gynecare European marketing plan



6/20/2001	ETH.MESH.00159473	Gynecare TVT Tension-free Support for Incontinence Mesh Sales Aid
	ETH.MESH.09279097	Prolene Mesh Improvement Project
11/14/2008	ETH.MESH.01203957	The Future of Surgical Meshes PowerPoint
5/6/2005	ETH.MESH.00526473	Email from Allison London Brown re laser-cut mesh
4/19/2004	ETH.MESH.0058411	Email from Gene Kammerer to Fabrice Jendly et al re Ultrasonic Slitting of Prolene Mesh for TVT
12/19/2005	ETH.MESH.00687819	Email from Kevin Mahar re Lazer cut mesh
10/18/2006	ETH.MESH.01822361	Email from Dan Smith re TVT Secur
2/27/2004	ETH.MESH.06881079	Email from Dan Smith re Important: 2 TVT Complaints concerning allegedly brittle mesh
4/18/2006	ETH.MESH.00167104	Martin Weisberg Clinical Expert Report Laser Cut Mesh
3/22/2006	ETH.MESH.01219984	Completion Report for the Design Verification of TVT Laser Cut Mesh
	ETH.MESH.00858252	Memo from Allison London Brown re Mechanical Cut vs. Laser Cut Mesh Rationale
	ETH.MESH.00156909	TVT Professional Education Program
2006	ETH.MESH.03131261	Barbolt, T., Biology of polypropylene/polyglactin 910 grafts
	ETH.MESH.00081133	Prolift +M IFU
6/18/2008	ETH.MESH.02126222	KOL Interview - Carl G. Nilsson
	ETH.MESH.02310501	Matrix - A powerful new tool in "Advanced Tissue Reconstruction"
	ETH.MESH.02310498	Matrix Avator Thunder Product Requirements
11/11/1998	ETH.MESH.09264884	Meeting minutes of Project Planning Meeting
01/1998	ETH.MESH.10183005	Gynecare European marketing plan
10/18/2010	ETH.MESH.00544657	Email from Lissette Caro-Rosado to Jonathan Meek re Lab results of Mesh roping evaluation
1/18/2003	ETH.MESH.05455878	Ethicon Surgeon Panel Meeting - Mesh - Suvretta House Hotel
6/12/2012	HMESH_ETH_00129489	Email from Lars Fuchte ti R. Kocharian, et al. re: Communication to BLT about article in Newspaper on Ultrapro
		All documents recently produced and to be produced by Ethicon regarding Dr. Klinge
		All documents recently produced and to be produced by Ethicon regarding Dr. Klosterhalfen
	ETH.MESH.10644647	TOPA Mesh Elongation KT Problem Analysis: Summary
4/14/2006	HMESH_ETH_00108021	Email from Regina Angelo to Martin Chomiak re TiMesh

8/31/2009	HMESH_ETH_00110207	Email from Jeffrey Rauso to Martin Chomiak re shrinkage
	LAB BOOK 3217	Elizabeth Vailhe's lab notebook
1/5/1995	DEPO.ETH.MESH.00000272	Lab Notebook 2801
9/18/2012	DEPO.ETH.MESH.00000863	Lab Notebook 3946
03/20/1984-10/23/1987	DEPO.ETH.MESH.00000348	Lab Notebook 1918
10/28/1987	DEPO.ETH.MESH.00000428	Lab Notebook 2148
	ETH.MESH.11336474	5 Year dog study data
	Lab Notebook 3984	
	Lab Notebook 3707	
	Lab Notebook 3156	
	Lab Notebook 3773	
	Lab Notebook 3870	
	ETH.MESH.11336184	Protocol for 10 year in Vivo Sutdy of Monofilament Sutures
	ETH.MESH.11336071	Two Year Interime Report
	ETH.MESH.11336165	10 Year In-Vivo Suture Study Scanning Electron Microscopy Five Year Report
	ETH.MESH.09888187	Seven Year Data for Ten Year Prolene Study: ERF 85-219
	ETH.MESH.11336181	Interim Report on the Physical Testing of Prolene, PVDF, Ethilon & Novafil After Seven Year Subcutaneous Implantation in the Beagle Dogs
	ETH.MESH.05243697	Wissenschaftliche Grundlagen und klinische evidenze von Netz-Impantaten
2008	ETH.MESH.05478745	Ultrapro Plug Tokyo Nov. 2008 by Boris Batke
	ETH.MESH.09264945	Prolene Mesh Re-Design
	ETH.MESH.08516133	
10/8/1987	ETH.MESH.12831407	Prolene Explants Study Meeting Minues 10/8/87
	HMESH_ETH_00379723	Discussions with patent department
1969	ETH.MESH.10575759	R.W. Postlethwair, Long-term Comparative Study of Nonabsorable Sutures, 1969
8/7/2007	ETH.MESH.05588132	Email from Barbara Schudlt to Dr. K. Junge re Ductus deferens Stdue
6/15/1982	ETH.MESH.12831405	6/15/82 Crack Depth in Explnated Prolene Polypropylene Sutures
11/12/1987	ETH.MESH.12831407	11/12/87 Explants Study Meeting Minutes 1/8/87
9/30/1987	ETH.MESH.12831391	9/30/87 IR Microscopy of explanted Prolene

1998	ETH.MESH.05845592	Mary, et al., Comparison of the In Vivo Behavior or Polyvinylidene Fluoride and Polypropylene Sutures used in Vascular Surgery
6/12/2009	DEPO.ETH.MESH.00003680	TVT-RR Benchmark testing
1/20/1988	DEPO.ETH.MESH.00004755	Guidon Explaint
7/21/2004	ETH.MESH.01220877	Email from Gene Kammerer re: Concept timeline MINT and Next Gen Materials - any updates needed?
7/16/2004	ETH.MESH.01220871	Email from Gene Kammerer re D'Art - Conversation with Prof. Jacquetin
8/16/2005	ETH.MESH.00130117	Email from Ophelie Berthier re ICS Prolift Abstracts
2/3/2000	ETH.MESH.12831360	2/3/00 Hellhammer meeting re Uppsala
2/19/1986	ETH.MESH.12831361	2/19/86 Dog Study Notes
3/14/1986	ETH.MESH.12831362	3/14/86 Dan Burkley Notes
7/18/1986	ETH.MESH.12831363	7/14/86 Dog Study notes
6/8/1987	ETH.MESH.12831365	6/8/87 Dog Study notes
6/15/1987	ETH.MESH.12831366	6/15/87 Dog Study notes
6/23/1987	ETH.MESH.12831367	6/23/87 Dog Study notes
6/24/1987	ETH.MESH.12831368	6/24/87 Dog Study notes
7/8/1987	ETH.MESH.12831369	7/8/87 Dog Study notes
6/11/1990	ETH.MESH.12831370	6/11/90 Dog study notes
6/18/1990	ETH.MESH.12831371	6/18/90 Dog study notes
6/20/1990	ETH.MESH.12831372	6/20/90 Dog study notes
6/27/1990	ETH.MESH.12831373	6/27/90 Dog study notes
5/1/1991	ETH.MESH.12831374	5/1/92 Dog Study notes
6/18/1992	ETH.MESH.12831375	6/18/92 Dog Study notes
7/2/1992	ETH.MESH.12831377	7/2/92 Dog study notes
9/22/1997	ETH.MESH.12831378	9/22/97 Dog Study notes
5/20/1999	ETH.MESH.12831380	5/20/99 Dog Study notes
6/24/1999	ETH.MESH.12831381	6/24/99 Dog Study notes
6/24/1999	ETH.MESH.12831382	6/24/99 Dog Study notes part II
12/17/1999	ETH.MESH.12831383	12/17/9 Dog Study notes
9/30/1987	ETH.MESH.12831391	9/30/87 IR Microscopy of explanted Prolene
6/15/1982	ETH.MESH.12831405	6/15/82 Crack Depth in Explnated Prolene Polypropylene Sutures
11/12/1987	ETH.MESH.12831407	11/12/87 Explants Study Meeting Minutes 1/8/87
6/14/2010		06/14/10 Klinge email re Dubai 2010 classification of mesh
	HMESH_ETH_00083293	Email from Boris Batke re Glossary of Meshes
		Email from Klinge re Glossary for meshes

	ETH.MESH.05478745	Ultrapro Plug presentation
	ETH.MESH.04945136	Poerngrosse Email attaching Muehl Article
	ETH.MESH.02184130	Email from Martin Chomiak re Nachtrag re; artikel
	ETH.MESH.05446129	
	ETH.MESH.01824104	
4/19/2004	ETH.MESH.00584811	Email from Gene Kammerer to Fabrice Jendly et al re Ultrasonic Slitting of Prolene Mesh for TVT
	ETH.MESH.00301874	

Date	Deponent
02/28/2012	Cliff Volpe
02/29/2012	
04/05/2012	
04/06/2012	
09/18/2012	Piet Hinoul
06/29/2013	
06/27/2013	
03/13/2012	
03/14/2012	David Robinson
08/23/2012	
09/11/2013	
3/9/2012	
3/9/2012	Sunny Rha
4/18/2012	Aaron Kirkemo
5/18/2012	Sean O'Bryan
03/29/2012	Scott Ciarrocca
03/30/2012	
12/03/2012	
03/27/2012	Vincenza Zaddem
03/28/2012	
2/24/2012	Elizabeth Vailhe
06/20/2013	Christophe Vailhe
06/21/2013	
12/14/2012	Joerg Holste
12/15/2012	
07/29/2013	
07/30/2013	
08/01/2013	Boris Batke
08/02/2013	
10/02/2012	Daniel Burkley
05/22/2013	
05/23/2013	

10/09/2012	
10/10/2012	
08/14/2013	
08/15/2013	
01/07/2014	
01/08/2014	
09/11/2013	Thomas Barbolt
09/12/2013	Brigitte Hellhammer
09/18/2013	Juergen Trzewik
09/19/2013	
5/31/2013	Martin Weisberg
7/20/13	Axel Arnaud
9/25/2013	
05/15/2013	Dan Smith
05/16/2013	
06/04/2013	
06/05/2013	
08/20/2013	
08/21/2013	
01/13/2014	Piet Hinoul
01/14/2014	
01/15/2014	
3/26/2014	Trial Testimony of Piet Hinoul
3/27/2014	
3/28/2014	



Date	Authors	Title	Cite
6/5/2012	Johnson, Katie	Johnson & Johnson Unit to Halt Urinary Implants	<a href="http://www.newyorktimes.com">www.newyorktimes.com</a>
6/20/2002	Barbar Schuldt-Hempe & Christoph Walther	German Patent No. DE10043396C120.06.2002	
7/10/2000		Pronova Suture 510(k)	
2011	Abed H., Rahn D., Lowenstein L., Balk E., Clemons J., Rogers R		Abed H., Rahn D., Lowenstein L., Balk E., Clemons J., Rogers R.; Incidence and management on graft erosion, wound granulation and dyspareunia following vaginal prolapse repair with graft materials: a systematic review. Int Urogynecol J (2011) 22:789-798
11/10/2009	Withagen MI, Vierhout ME, Milani AL	Does trocar-guided tension-free vaginal mesh (Prolift) repair provoke prolapse of the unaffected compartments?	Withagen MI, Vierhout ME, Milani AL; Does trocar-guided tension-free vaginal mesh (Prolift) repair provoke prolapse of the unaffected compartments? Int Urogynecol J. 2010 Mar;21(3):271-8. Epub 2009 Nov 10.
2011	Altman D., Väyrynen T., Ellström Engh M., Axelsen S., Falconer C.	Anterior Colporrhaphy versus Transvaginal Mesh for Pelvic-Organ Prolapse.	Altman D., Väyrynen T., Ellström Engh M., Axelsen S., Falconer C., (Transvaginal Mesh Group*) Anterior Colporrhaphy versus Transvaginal Mesh for Pelvic-Organ Prolapse. N Engl J Med 2011;364:1826-36.

6/4/2010	Kirschner-Hermanns R, Klinge U, Klosterhalfen B, Brehmer B, Heidenreich A	What can we learn from explanted slings and meshes in pelvic floor surgery?	Kirschner-Hermanns R, Klinge U, Klosterhalfen B, Brehmer B, Heidenreich A; What can we learn from explanted slings and meshes in pelvic floor surgery? The Journal of Urology, 1772 Vol. 183, No. 4, Supplement (2010)
2009	Blandon R, Gebhart J, Trabuco E, Klingele J	Complications from vaginally placed mesh in pelvic reconstructive surgery	Blandon R, Gebhart J, Trabuco E, Klingele J, Complications from vaginally placed mesh in pelvic reconstructive surgery. Int Urogynecol J (2009) 20:523-531
2008	Jeffrey S, de Jong P	Mesh, Grafts and Kits in Pelvic Organ Prolapse Surgery: Where are we now?	Jeffrey S, de Jong P: Mesh, Grafts and Kits in Pelvic Organ Prolapse Surgery: Where are we now? aSAUGR Vol. 6, No. 1 (2008)
9/8/2011	FDA Executive Summary	Surgical Mesh for Treatment of Women with Pelvic Organ Prolapse and Stree Urinary Incontinence	
2008	Moalli P, Papas N, Menefee S, Albo M, Meyn L, Abramowitch D	Tensile properties of five commonly used mid-urethral slings relative to TVT	Moalli P, Papas N, Menefee S, Albo M, Meyn L, Abramowitch D; Tensile properties of five commonly used mid-urethral slings relative to TVT. Int Urogynecol J (2008) 19:655-663

4/29/2007	Tunn R, Picot A, Marschke J, Gauruder-Burmester A	Sonomorphological evaluation of polypropylene mesh implants after vaginal mesh repair in women with cystocele or rectocele.	Tunn R, Picot A, Marschke J, Gauruder-Burmester A, Sonomorphological evaluation of polypropylene mesh implants after vaginal mesh repair in women with cystocele or rectocele. Ultrasound Obstet Gynecol. 2007 Apr;29(4):449-52.
4/10/2006 02/02/2006	Harrell AG, Novitsky YW, Kercher KW, Foster M, Burns JM, Kuwada TS, Heniford BT	In vitro infectability of prosthetic mesh by methicillin-resistant Staphylococcus aureus.	Harrell AG, Novitsky YW, Kercher KW, Foster M, Burns JM, Kuwada TS, Heniford BT In vitro infectability of prosthetic mesh by methicillin-resistant Staphylococcus aureus. Hernia. 2006 Apr;10(2):120-4. Epub 2006 Feb 2
2003	Culligan P, Heit M, Blackwell L, Graham C, Snyder J	Bacterial Colony Counts During Vaginal Surgery	Culligan P, Heit M, Blackwell L, Graham C, Snyder J. Bacterial Colony Counts During Vaginal Surgery. Infect Dis Obstet Gynecol. 2003; 11: 161-165
2009	Vollebregt A, Troelstra A, van der Vaart C.	Bacterial Colonisation of collagen-coated polypropylene vaginal mesh: Are additional intraoperative sterility procedures useful?	Vollebregt A, Troelstra A, van der Vaart C. Bacterial Colonisation of collagen-coated polypropylene vaginal mesh: Are additional intraoperative sterility procedures useful? Int Urogynecol J. 2009; 20:1345-1351

04/2010	Letouzey V, Fritel X, Pierre F, Courtieu C, Marès P, de Tayrac R.	Informing a patient about surgical treatment for pelvic organ prolapse.	Letouzey V, Fritel X, Pierre F, Courtieu C, Marès P, de Tayrac R. Informing a patient about surgical treatment for pelvic organ prolapse. Gynecol Obstet Fertil. 2010 Apr;38(4):255-60.
2003		Gynemesh PS IFU	
2007	Klinge U, Binneboesel M, Kuschel S, Scheussler B	Demands and properties of alloplastic implants for the treatment of stress urinary incontinence	Klinge U, Binneboesel M, Kuschel S, Scheussler B. Demands and properties of alloplastic implants for the treatment of stress urinary incontinence. Expert Rev. Med. Devices. 2007; 4(3):349-359
2013	Thomas Muhl	Prolift Expert Report	
2007	Muhl T, Binneboesel M, Klinge U, Goedderz T	New Objective Measurement to Characterize the Porosity of Textile Implants.	Muhl T, Binneboesel M, Klinge U, Goedderz T. New Objective Measurement to Characterize the Porosity of Textile Implants. J Biomed Mater Res Part B: Appl Biomater. 2007; 84B:176-183
1998	Klinge U, Klosterhalfen B, Muller M, Schumpelick V	Foreign Body reaction to Meshes Used for the Repair of Abdominal Wall Hernias	Klinge U, Klosterhalfen B, Muller M, Schumpelick V. Foreign Body reaction to Meshes Used for the Repair of Abdominal Wall Hernias
1998	Klinge U, Klosterhalfen B, Muller M, Ottinger A, Schumpelick V.	. Shrinking of Polypropylene Mesh in vivo: An Experimental Study in Dogs	Klinge U, Klosterhalfen B, Muller M, Ottinger A, Schumpelick V. Shrinking of Polypropylene Mesh in vivo: An Experimental Study in Dogs. Eur J Surg. 1998; 164; 965-969

2012	Klinge U, Klosterhalfen B.	Modified Classification of surgical meshes for hernia repair based on the analyses of 1000 explanted meshes	Klinge U, Klosterhalfen B. Modified Classification of surgical meshes for hernia repair based on the analyses of 1000 explanted meshes. Hernia. 2012; 1-8
1997	Amid P K	Classification of biomaterials and their related complications in abdominal wall hernia surgery	Amid P K. Classification of biomaterials and their related complications in abdominal wall hernia surgery. Hernia. 1997; 1:15-21.
2012	Coda A, Lamberti R	Classification of prosthetics used in hernia repair based on weight and biomaterial	Coda A, Lamberti R. Classification of prosthetics used in hernia repair based on weight and biomaterial. Hernia. 2012 Feb;16(1):9-20. Epub 2011 Aug 12.
2011	Binnebosel M, von Trotha K, Jansen P, Conze J, Neumann U, Junge K	Biocompatibility of prosthetic meshes in abdominal surgery	Binnebosel M, von Trotha K, Jansen P, Conze J, Neumann U, Junge K. Biocompatibility of prosthetic meshes in abdominal surgery. Semin Immunopathol. 2011; 33: 235-243
2011	Deeken C, Abdo M, Frisella M, Matthews B	Physicomechanical evaluation of absorbable and nonabsorbable barrier composite meshes for laparoscopic ventral hernia repair.	Deeken C, Abdo M, Frisella M, Matthews B. Physicomechanical evaluation of absorbable and nonabsorbable barrier composite meshes for laparoscopic ventral hernia repair. Surg Endosc. 2011; 25:1541-1552

2008	Weyhe D, Belyaev O, Buettner G, Mros K, Mueller C, Muerer K, Papapostolou G, Uhl W.	In Vitro Comparison of Three Different Mesh Contructions	Weyhe D, Belyaev O, Buettner G, Mros K, Mueller C, Muerer K, Papapostolou G, Uhl W. In Vitro Comparison of Three Different Mesh Contructions. ANZ J. Surg. 2008; 78:55-60
2005	Cobb W, Kercher K, Heniford T.	The Argument for Lightweight Polypropylene Mesh in Hernia Repair	Cobb W, Kercher K, Heniford T. The Argument for Lightweight Polypropylene Mesh in Hernia Repair. Surgical Innovation. 2005; 12(1):T1-T7
2006	Weyhe D, Schmitz I, Belyaev O, Grabs R, Muller K, Uhl W, Zumtobel V.	Experimental Comparison of Monofile Light and Heave Polypropylene Meshes: Less Weight Does not Mean Less Biological Response	Weyhe D, Schmitz I, Belyaev O, Grabs R, Muller K, Uhl W, Zumtobel V. Experimental Comparison of Monofile Light and Heave Polypropylene Meshes: Less Weight Does not Mean Less Biological Response. World J Surg. 2006 Aug;30(8):1586-91
12/19/2000		US Patent No. 6,169,962	
5/20/2000		Prolene Soft 510(k)	
1/22/2001	Gabriel B, Rubod C, Brieu M, Dedet B, de Landsheere L, Delmas V, Cosson M	Vagina, abdominal skin, and aponeurosis: do they have similar biomechanical properties?	Gabriel B, Rubod C, Brieu M, Dedet B, de Landsheere L, Delmas V, Cosson M. Vagina, abdominal skin, and aponeurosis: do they have similar biomechanical properties? Int Urogynecol J. 2011 Jan;22(1):23-7. Epub 2010 Aug 27.)



2004	Cosson M, Lambaudie E, Boukerrou M, Lobry P, Crépin G, Ego A	A biomechanical study of the strength of vaginal tissues. Results on 16 post-menopausal patients presenting with genital prolapse	Cosson M, Lambaudie E, Boukerrou M, Lobry P, Crépin G, Ego A. A biomechanical study of the strength of vaginal tissues. Results on 16 post-menopausal patients presenting with genital prolapse. Eur J Obstet Gynecol Reprod Biol. 2004 Feb 10;112(2):201-5
2010	Kavvadias T, Klinge U, Schuessler B	Alloplastic implants for the Treatment of Stress Urinary Incontinence and Pelvic Organ Prolapse	Kavvadias T, Klinge U, Schuessler B. Alloplastic implants for the Treatment of Stress Urinary Incontinence and Pelvic Organ Prolapse. Springer Berlin Heidelberg. 2010; 439-444
2005	Holste, J	Are meshes with lightweight construction strong enough?	Holste J. Are meshes with lightweight construction strong enough? Int Surg. 2005; 90:S10-S12
2012	Elliott, D	mesh in vaginal surgery: do the risks outweigh the benefits?	Elliott, D. CON: mesh in vaginal surgery: do the risks outweigh the benefits? Wolters Kluwer Health. 2012
2008	Boulanger L, Boukerrou M, Rubod C, Collinet P, Fruchard A, Courcol RJ, Cosson M.	Bacteriological analysis of meshes removed for complications after surgical management of urinary incontinence or pelvic organ prolapse	Boulanger L, Boukerrou M, Rubod C, Collinet P, Fruchard A, Courcol RJ, Cosson M. Bacteriological analysis of meshes removed for complications after surgical management of urinary incontinence or pelvic organ prolapse. Int Urogynecol J Pelvic Floor Dysfunct. 2008 Jun;19(6):827-31.

2007	Boukerrou M, Boulanger L, Rubod C, Lambaudie E, Dubois P, Cosson M.	Study of biomechanical properties of synthetic mesh implanted in vivo.	Boukerrou M, Boulanger L, Rubod C, Lambaudie E, Dubois P, Cosson M. Study of biomechanical properties of synthetic mesh implanted in vivo. European Journal of Obstetrics & Gynecology and Reproductive Biology. 2007; 134:262-267
2008	Rubod C, Boukerrou M, Brieu M, Jean-Charles C, Dubois P, Cosson M.	Biomechanical properties of vaginal tissue: preliminary results	Rubod C, Boukerrou M, Brieu M, Jean-Charles C, Dubois P, Cosson M. Biomechanical properties of vaginal tissue: preliminary results. Int Urogynecol J. 2008; 19:811-816
2003	Cosson M, Lambaudie E, Boukerrou M, Lobry P, Crépin G, Ego A.	A biomechanical study of the strength of vaginal tissues. Results on 16 post-menopausal patients presenting with genital prolapse.	Cosson M, Lambaudie E, Boukerrou M, Lobry P, Crépin G, Ego A. A biomechanical study of the strength of vaginal tissues. Results on 16 post-menopausal patients presenting with genital prolapse. Eur J Obstet Gynecol Reprod Biol. 2003 Feb 10;112(2):201-5.
2012	Mangera A; Bullock A, Chapple C, MacNeil S.	Are Biomechanical Properties Predictive of the Success of Prostheses Used in Stress Urinary Incontinence and Pelvic Organ Prolapse? A Systematic Review	Mangera A; Bullock A, Chapple C, MacNeil S. Are Biomechanical Properties Predictive of the Success of Prostheses Used in Stress Urinary Incontinence and Pelvic Organ Prolapse? A Systematic Review. Neurourology and Urodynamics 31:13–21 (2012)

2008	Conze, J., et al.,	New polymer for intra-abdominal meshes--PVDF copolymer	Conze, J., et al., New polymer for intra-abdominal meshes--PVDF copolymer. J Biomed Mater Res B Appl Biomater, 2008. 87(2): p. 321-8.
2011	Junge K, Binnebosel M, von Trotha K, Rosch R, Klinge U, Neumann U, Jansen P.	Mesh Biocompatibility: effects of cellular inflammation and tissue remodeling.	Junge K, Binnebosel M, von Trotha K, Rosch R, Klinge U, Neumann U, Jansen P. Mesh Biocompatibility: effects of cellular inflammation and tissue remodeling. Langenbecks Arch Surg. 2011
2002	Klinge U, Klosterhalfen B, Ottinger A, Junge K, Schumpelick V	PVDF as a new polymer for the construction of surgical meshes	Klinge U, Klosterhalfen B, Ottinger A, Junge K, Schumpelick V. PVDF as a new polymer for the construction of surgical meshes. Biomaterials 2002; 23:3487-3493
1994	Urban E, King MW, Guidoin R.	Why make monofilament sutures out of polyvinylidene fluoride?	Urban E, King MW, Guidoin R. Why make monofilament sutures out of polyvinylidene fluoride? ASAIO J. 1994; 40:145-156
1998	Mary C, Maroid Y, King M	Comparison of the in vivo behavior of polyvinylidenefluoride and polypropylene sutures in vascular surgery	Mary C, Maroid Y, King M. Comparison of the in vivo behavior of polyvinylidenefluoride and polypropylene sutures in vascular surgery. ASAIO J. 1998; 44: 199-206

1995	Laroche G, Marois Y, Guidoin R.	Polyvinylidene fluoride (PVDF) as a biomaterial: from polymeric raw material to monofilament vascular suture.	Laroche G, Marois Y, Guidoin R. Polyvinylidene fluoride (PVDF) as a biomaterial: from polymeric raw material to monofilament vascular suture. J. Biomed. Mater. Res. 1995; 29:1525-1536
2007	Binnebosel, M.,	Biomechanical analyses of overlap and mesh dislocation in an incisional hernia model in vitro.	Binnebosel, M., et al., Biomechanical analyses of overlap and mesh dislocation in an incisional hernia model in vitro. Surgery, 2007. 142(3): p. 365-71.
2011	Orenstein S, Saberski E, Kreutzer D, Novtisky Y.	Comparative Analysis of Histopathologic Effects of Synthetic Meshes Based on Material, Weight, and Pore Size in Mice.	Orenstein S, Saberski E, Kreutzer D, Novtisky Y. Comparative Analysis of Histopathologic Effects of Synthetic Meshes Based on Material, Weight, and Pore Size in Mice. Journal of Surgical Research. 2011; 1-7
2011	Ostergard, D.	Degradation, infection and heat effects of polypropylene mesh for pelvic implantation: what was known and when it was known	Ostergard, D. Degradation, infection and heat effects of polypropylene mesh for pelvic implantation: what was known and when it was known. Int Urogynecol J. 2011; 22:771-774
2010	Costello CR, Bachman SL, Ramshaw BJ, Grant SA.,	Materials characterization of explanted polypropylene hernia meshes.	Costello CR, Bachman SL, Ramshaw BJ, Grant SA., Materials characterization of explanted polypropylene hernia meshes. J Biomed Mater Res B Appl Biomater. 2010 Aug;94(2):455-62;

2010	Cozad MJ, Grant DA, Bachman SL, Grant DN, Ramshaw BJ, Grant SA	Materials characterization of explanted polypropylene, polyethylene terephthalate, and expanded polytetrafluoroethylene composites: spectral and thermal analysis	Cozad MJ, Grant DA, Bachman SL, Grant DN, Ramshaw BJ, Grant SA. Materials characterization of explanted polypropylene, polyethylene terephthalate, and expanded polytetrafluoroethylene composites: spectral and thermal analysis.
2007	Clavé A, Yahi H, Hammou JC, Montanari S, Gounon P, Clavé H.	Polypropylene as a reinforcement in pelvic surgery is not inert: comparative analysis of 100 explants	Clavé A, Yahi H, Hammou JC, Montanari S, Gounon P, Clavé H., Polypropylene as a reinforcement in pelvic surgery is not inert: comparative analysis of 100 explants. J Biomed Mater Res B Appl Biomater. 2007 Oct;83(1):44-9
2007	Costello C, Bachman S, Grant S, Cleveland D, Loy T, Ramshaw B.	Characterization of Heavyweight and Lightweight Polypropylene Prosthetic Mesh Explants from a Single Patient.	Costello C, Bachman S, Grant S, Cleveland D, Loy T, Ramshaw B. Characterization of Heavyweight and Lightweight Polypropylene Prosthetic Mesh Explants from a Single Patient. Surgical Innovation. 2007; 14(3):168-176
1982	Williams D	Review Biodegradation of surgical polymers	Williams D. Review Biodegradation of surgical polymers. Journal of Materials Science. 1982; 17:1233-1246
1976	Liebert T, Chartoff R, Costgrove S.	Subcutaneous Implants of Polypropylene Filaments.	Liebert T, Chartoff R, Costgrove S. Subcutaneous Implants of Polypropylene Filaments. J.Biomed. Mater. Res. 1976; 10:939-951

1998	Leber G, Garb JL, Alexander, AI, Reed, WP.	Long-Term Complications Associated with Prosthetic Repair of Incisional Hernia.	Leber G, Garb JL, Alexander, AI, Reed, WP. Long-Term Complications Associated with Prosthetic Repair of Incisional Hernia. Arch. Surg. 1998; 133:378-382.
2007	Bellon JM, Rodriguez M, Garcia-Honduvilla N, Pascual G, Bujan J.	Partially Absorbable Meshes for hernia repair offer advantages over nonabsorbable meshes.	Bellon JM, Rodriguez M, Garcia-Honduvilla N, Pascual G, Bujan J. Partially Absorbable Meshes for hernia repair offer advantages over nonabsorbable meshes. The American Journal of Surgery. 2007; 194:68-74
2007	B. Todd Heniford	"The benefits of lightweight meshes in Ventral Hernia Repair in Ventral Hernia Repair" Cover	
2007	B. Todd Heniford	"The benefits of lightweight meshes in Ventral Hernia Repair in Ventral Hernia Repair" Video	
6/20/2002	Barbar Schuldt-Hempe & Christoph Walther	German Patent No. DE10043396C120.06.2002 Translated	
		Johnson & Johnson Credo	
		Johnson & Johnson "Our Ethicon Code for the Conduct of Research and Development"	
2005	Klosterhalfen, B., Junge, K., Klinge, U.	The lightweight and large porous mesh concept for hernia repair	Klosterhalfen, B., Junge, K., Klinge, U. The lightweight and large porous mesh concept for hernia repair. Expert Rev. Med. Devices. 2005; 2(1)
2000		"Company News; Sunoco Agrees to Buy Mitsubishi's Aristech Chemical"	<a href="http://www.newyorktimes.com">www.newyorktimes.com</a>
2004		Sunoco MSDS	
4/19/2012		Airgas MSDS	
1/28/1998		Email to Greg Jones from FDA re TVT	FDA Website



5/6/2012	Shah, K., Nikolavsky D., Flynn, B.	Bacteriological analysis of Explanted Transvaginal Meshes	
2007	Rezapour M., Novara G., Meier, P., Holste J., Landgrebe S., Artibani W.,	A 3-month preclinical trial to assess the performance of a new TVT-like mesh (TVT <sub>x</sub> ) in a sheep model	Rezapour M., Novara G., Meier, P., Holste J., Landgrebe S., Artibani W., A 3-month preclinical trial to assess the performance of a new TVT-like mesh (TVT <sub>x</sub> ) in a sheep model. Int Urogynecol J. 2007; 18:183-187
2006	Meshia, M., Pifarotti, P., Bernasconi, F., Magatti, F., Vigano, R., Bertozzi, R., Barbacini, P.,	Tension-free vaginal tape (TVT) and intravaginal slingplasty (IVS) for stress urinary incontinence: A multicenter randomized trial	Meshia, M., Pifarotti, P., Bernasconi, F., Magatti, F., Vigano, R., Bertozzi, R., Barbacini, P., Tension- free vaginal tape (TVT) and intravaginal slingplasty (IVS) for stress urinary incontinence: A multicenter randomized trial. American Journal of Obstetrics and Gynecology. (2006); 195, 1338-42
2013	Birolini, C., Minossi, J., Lima, C., Utiyama, E., Rassian S.,	Mesh cancer: long-term mesh infection leading to squamous-cell carcinoma of the abdominal wall.	Birolini, C., Minossi, J., Lima, C., Utiyama, E., Rassian S., Mesh cancer: long-term mesh infection leading to squamous-cell carcinoma of the abdominal wall.Hernia. (2012)

2012	Kwon, S., Latchamsetty, K., Benson, J., Carreno, M.,	Inflammatory Myofibroblastic Tumor of the Urinary Tract Following a TVT	Kwon, S., Latchamsetty, K., Benson, J., Carreno, M., Inflammatory Myofibroblastic Tumor of the Urinary Tract Following a TVT. Female Pelvic Medicine & Reconstructive Surgery. (2012) 18:4
2013	Otto, J., Kaldenhoff, E., Kirschner-Hermanns, R., Muhl, T., Klinge, U.	Elongation of textile pelvic floor implants under load is related to complete loss of effective porosity, thereby favoring incorporation in scar plates.	Otto, J., Kaldenhoff, E., Kirschner-Hermanns, R., Muhl, T., Klinge, U. Elongation of textile pelvic floor implants under load is related to complete loss of effective porosity, thereby favoring incorporation in scar plates. Wiley Online
2013	Feola, A., Abramowitch, S., Jallah, Z., Stein, S., Barone, W., Palcsey, S., Moalli, P.,	Deteriorating in biomechanical properties of the vagina following implantation of a high-stiffness prolapse mesh.	Feola, A., Abramowitch, S., Jallah, Z., Stein, S., Barone, W., Palcsey, S., Moalli, P., Deteriorating in biomechanical properties of the vagina following implantation of a high-stiffness prolapse mesh. BJOG. (2013); 120:224-232
2012	Liang, R., Abramowitch, S., Knight, K., Palcsey, S., Nolfi, A., Feola, A., Stein, S., Moalli, PA.	Vaginal degeneration following implantation of synthetic mesh with increased stiffness	Liang, R., Abramowitch, S., Knight, K., Palcsey, S., Nolfi, A., Feola, A., Stein, S., Moalli, PA. Vaginal degeneration following implantation of synthetic mesh with increased stiffness. BJOG (2012); 120:233-243

2013	Klinge, U., Keun-Park, J., Klosterhalfen, B.	The Ideal Mesh?	Klinge, U., Keun-Park, J., Klosterhalfen, B. 'The Ideal Mesh?'. Pathobiology (2013); 80:169-175
2011	Klink C., Junge, J., Binnebosel., Alizai, H., Otto, J., Neumann, U., Klinge, U.	Comparison of Long-Term biocompatibility of PVDF and PP meshes	Klink C., Junge, J., Binnebosel., Alizai, H., Otto, J., Neumann, U., Klinge, U. Comparison of Long- Term biocompatibility of PVDF and PP meshes. Journal of Investigative Surgery (2011); 24:292-299
2013	Scaff Junior, M., Fares, N., Leite, K., Goncalves, A.	Changing Mesh Material would change the Inflammatory Response? Differences between Polypropylene (Gynemesh) and Polyvinylidene Fluoride (Dynamesh) Mesh implant in Rabbits Vaginal Wall	
1997	Klosterhalfen, B., Klinge, U., Henze, U., Bhardwaj, R., Conze, J., Schumpelick, V.	Morphologische Korrelation der funktionellen Bauchwandmechanik nach Mesh-Implantation	
2007	Silva, R., Silva, P., Carvalho, M.	Degradation Studies of Some Polymeric Biomaterials: Polypropylene (PP) and Polyvinylidene Difluoride (PVDF)	Silva, R., Silva, P., Carvalho, M. Degradation Studies of Some Polymeric Biomaterials: Polypropylene (PP) and Polyvinylidene Difluoride (PVDF). Material Science Forum (2007); 593-543

1984	Williams, DF	The biodegradation of surgical polymers	Williams, D.F. Biodegradation of surgical polymers, In "POLYURETHANES IN BIOMEDICAL ENGINEERING", Plenk, H., Egbers, G. and Syre, I., Elsevier, Amsterdam, 1984, 93-102.
1987	Smith, R., Oliver, C., Williams, DF.	The enzymatic degradation of polymers in vitro	Smith, R., Oliver, C., Williams, DF. The enzymatic degradation of polymers in vitro. Journal of Biomedical Materials Research (1987); 21:991-1003
1998		Tension Free Vaginal Tape 510k	
2013	Wang, Y., Zhang, P.	Plastic Deformaton of Polyvinylidene Flouride and Polypropylene Suture Materials Used for Hernia Repair	Wang, Y., Zhang, P. Plastic Deformation of Polyvinylidene Flouride and Polypropylene Suture Materials Used for Hernia Repair. (2013); Advanced Materials Research; 641-642 pg 456-489
8/4/2004	Ulf Ulmsten	EP 1 151 722 B1 European Patent Specification: Surgical tape for treating female urinary incontinnence	
12/10/2002	Ulf Ulmsten	US 6,491,703 B1: US Patent: Surgical insturment for treating female urinary incontinence	
6/24/1905	Klinge, U., Klosterhalfen, B., Birkenhauser, V., Junge, K., Conze, J., Schumpelick, V.	Impact of Polymer Pore Size on the Interface Scar Formation in a Rat Model	Klinge, U., Klosterhalfen, B., Birkenhauser, V., Junge, K., Conze, J., Schumpelick, V. Impact of Polymer Pore Size on the Interface Scar Formation in a Rat Model. Journal of Surgiccal Research. 103, 208-214 (2002)

2013	Rohrnbauer, B., Mazza, E.	A non-biological model system to simulate the in vivo mechanical behavior of prosthetic meshes	Rohrnbauer, R., Mazza, E., A non-biological model system to simulate the in vivo mechanical behavior of prosthetic meshes. (2013); Journal of the Mechanical Behavior of Biomedical Materials: 305-315
		CV of Daniel Smith	
2/20/2013		TVT Patient Brochure 2013	
7/24/2013		Snippet from David Robinson Deposition	
7/29/2013		Snippet from Joerg Holste Deposition	
2005	Cobb W, Kercher K, Heniford T.	The Argument for Lightweight Polypropylene Mesh in Hernia Repair	Cobb W, Kercher K, Heniford T. The Argument for Lightweight Polypropylene Mesh in Hernia Repair. Surgical Innovation. 2005; 12(1):T1-T7
		ISO 14971	
1/28/1998		TVT 510(k)	
		Physicians Participating in Cadaver Labs for TVT products	
		Table of Contents for TVT S E-DHF	
		Images of TVT Products	
2003	Hilton, P., Mohammed, K.A., Ward, K.	Postural perineal pain associated with perforation of the lower urinary tract due to insertion of a tension-free vaginal tape	Hilton, P., Mohammed, K.A., Ward, K. Postural perineal pain associated with perforation of the lower urinary tract due to insertion of a tension-free vaginal tape. BJOG (2003) 110; 79-82

2001	Wyczolkowski, M., Klima W., Piasecki, Z.	Reoperation After Complicated Tension-Free Vaginal Tape Procedures	Wyczolkowski, M., Klima W., Piasecki, Z. Reoperation After Complicated Tension-Free Vaginal Tape Procedures. The Journal of Urology (2001) 166; 1004-1005
		"Continence Health European Experts Meeting" PowerPoint Presentation	
2009	Orenstein S, Saberski E, Klueh, U. Kreutzer D, Novtisky Y.	Effects of mast cell modulation on early host response to implanted synthetic tension	Orenstein S, Saberski E, Klueh, U. Kreutzer D, Novtisky Y. Effects of mast cell modulation on early host response to implanted synthetic tension. (2009) Hernia; 14:511-516
2010	Orenstein, S., Qiao, Y., Kaur, M., Klueh, U., Kreutzer, D., Novistky, Y.,	In Vitro Activation of Human Peripheral Blood Mononuclear cells Induced by Human Biologic Meshes	Orenstein, S., Qiao, Y., Kaur, M., Klueh, U., Kreutzer, D., Novistky, Y., In Vitro Activation of Human Peripheral Blood Mononuclear cells Induced by Human Biologic Meshes. (2010) Journal of Surgical Research 158:10-14
1965	H.J. Oswald, E. Turi	The Deterioration of Polypropylene By Oxidative Degradation	H.J. Oswald, E. Turi, The Deterioration of Polypropylene By Oxidative Degradation, Polymer Engineering and Science, 5 (1965) 152-158.
2007	R. A. Silva, P. A. Silva and M. E. Carvalho	Materials Science Forum	R. A. Silva, P. A. Silva and M. E. Carvalho, Materials Science Forum 539-543 (2007) 573-576.
2012	Jongebloed WL		Jongebloed WL. Doc Ophth 1986; 64:143,



1979	Osterberg B.	Bacterial Contamination of Surgical Suture resembles a biofilm	Osterberg B. ActaChirScand1979;145:431,
1998	An Y	Concise review of mechanisms of bacterial adherence to biomaterial surfaces	An Y. Concise review of mechanisms of bacterial adherence to biomaterial surfaces J Biomed Mater Res (Appl Biomat) 1998;43:338
1991	Merritt K.	Factors influencing Bacterial adherence to biomaterials	Merritt K. Factors influencing Bacterial adherence to biomaterials J BiomatAppl 1991;5:185,
1998	Celine Mary, Yves Marois, Martin W. King, Gaetan Laroche, Yvan Douville, Louisette Martin, Robert Guidoin,	Comparison of the In Vivo Behaviour of Polyvinylidene Fluoride and Polypropylene Sutures Used in Vascular Surgery	Celine Mary, Yves Marois, Martin W. King, Gaetan Laroche, Yvan Douville, Louisette Martin, Robert Guidoin, Comparison of the In Vivo Behaviour of Polyvinylidene Fluoride and Polypropylene Sutures Used in Vascular Surgery, ASAIO Journal, 44 (1998) 199-206
2011	C. D. Klink, K. Junge, M. Binnebosel, H. P. Alizai, J. Otto, U. P. Neumann, U. Klinge	Comparison of Long-Term Biocompatibility of PVDF and PP Meshes	C. D. Klink, K. Junge, M. Binnebosel, H. P. Alizai, J. Otto, U. P. Neumann, U. Klinge, Comparison of Long-Term Biocompatibility of PVDF and PP Meshes, Journal of Investigative Surgery, 24 (2011) 292-299.

2013	Bittner, R., et al.	Guidelines for laparoscopic treatment of ventral and incisional abdominal wall hernias (International Endohernia Society [IEHS] - Park III	Bitnner, R., et al., Guidelines for laparoscopic treatment of ventral and incisional abdominal wall hernias (International Endohernia Society [IEHS] - Park III. (2013) Surg Endoscopy DOI 10.1007/s00464-013-3172-4
2009	Junge K., Binnebosel, M., Rosch R., Jansen, M., Kammer, D., Otto, J., Schumpelick, V., Klinge, U	Adhesion formation of a polyvinylidene fluoride/polypropylene mesh for intra-abdominal placement in a rodent animal model	Junge K., Binnebosel, M., Rosch R., Jansen, M., Kammer, D., Otto, J., Schumpelick, V., Klinge, U., Adhesion formation of a polyvinylidene fluoride/polypropylene mesh for intra-abdominal placement in a rodent animal model. (2009) Surg Endosc; 23(2):327-33
1999	Schumpelick V, Klosterhalfen B, Müller M, Klinge U	Minimized polypropylene mesh for preperitoneal net plasty (PNP) of incisional hernia	Schumpelick V, Klosterhalfen B, Müller M, Klinge U. [Minimized polypropylene mesh for preperitoneal net plasty (PNP) of incisional hernias]. Chirurg. 1999 Apr;70(4):422-30.
2013	Sajid MS, Kalra L, Parampalli U, Sains PS, Baig MK.	A systematic review and meta-analysis evaluating the effectiveness of lightweight mesh against heavyweight mesh in influencing the incidence of chronic groin pain following laparoscopic inguinal hernia repair	Sajid MS, Kalra L, Parampalli U, Sains PS, Baig MK. A systematic review and meta-analysis evaluating the effectiveness of lightweight mesh against heavyweight mesh in influencing the incidence of chronic groin pain following laparoscopic inguinal hernia repair. Am J Surg (2013) 205(6):726-36

2009	Simons MP, Aufenacker T, Bay-Nielsen M, Bouillot JL, Campanelli G, Conze J, de Lange D, Fortelny R, Heikkinen T, Kingsnorth A, Kukleta J, Morales-Conde S, Nordin P, Schumpelick V, Smedberg S, Smietanski M, Weber G, Miserez M	Guidelines for laparoscopic treatment of ventral and incisional abdominal wall hernias	Simons MP, Aufenacker T, Bay-Nielsen M, Bouillot JL, Campanelli G, Conze J, de Lange D, Fortelny R, Heikkinen T, Kingsnorth A, Kukleta J, Morales-Conde S, Nordin P, Schumpelick V, Smedberg S, Smietanski M, Weber G, Miserez M. Guidelines for laparoscopic treatment of ventral and incisional abdominal wall hernias (International Endohernia Society [IEHS])-Part III.(2009) Hernia
2013	Ruiz-Zapata, A., Kerkhof, M., Zandieh-Doulabi, B., Brolman, H., Smit, T., Helder, M.	Fibroblasts from women with pelvic prolapse show differential mechanoresponses depending on surface substrates	Ruiz-Zapata, A., Kerkhof, M., Zandieh-Doulabi, B., Brolman, H., Smit, T., Helder, M. Fibroblasts from women with pelvic prolapse show differential mechanoresponses depending on surface substrates. Int Urogynecol J (2013) 24:1567-1575
2006	Jansen, L., Rosch, R., Rezvani, M., Mertens, PR., Junge, K., Jansen, M., Klinge, U.	Hernia fibroblasts lack beta-estradiol-induced alterations of collagen gene expression	Jansen, L., Rosch, R., Rezvani, M., Mertens, PR., Junge, K., Jansen, M., Klinge, U. Hernia fibroblasts lack beta-estradiol-induced alterations of collagen gene expression. BMC Cell Biol (2006); 7:36

2006	Rosch, R., Lynene-Jansen, P., Junge, K., Knops, M., Klosterhalfen, B., Klinge, U., Mertens, PR., Schumpelick, V.,	Biomaterial-dependent MMP-2 expression in fibroblasts from patients with recurrent incisional hernias	Rosch, R., Lynene-Jansen, P., Junge, K., Knops, M., Klosterhalfen, B., Klinge, U., Mertens, PR., Schumpelick, V., Biomaterial-dependent MMP-2 expression in fibroblasts from patients with recurrent incisional hernias. Hernia (2006) 10(2):125-130
2002	Zheng, H., Si, Z., Kasperk, R., Bhardwaj, RS., Schumpelick, V., Klinge, U., Klosterhalfen, B.	Recurrent inguinal hernia: disease of the collagen matrix?	Zheng, H., Si, Z., Kasperk, R., Bhardwaj, RS., Schumpelick, V., Klinge, U., Klosterhalfen, B. Recurrent inguinal hernia: disease of the collagen matrix?. World J Surg (2002) 26(4):401-8
2002	Si, Z., Bhardwaj, R., Rosch, R., Mertens, PR., Klosterhalfen, B., Klinge, U.	Impaired balance of type I and type II procollagen mRNA in cultured fibroblasts in patients with incisional hernia.	Si, Z., Bhardwaj, R., Rosch, R., Mertens, PR., Klosterhalfen, B., Klinge, U. Impaired balance of type I and type II procollagen mRNA in cultured fibroblasts in patients with incisional hernia. Hernia (2002) 131(3):324-31
2002	Rosch, R., Klinge, U., Si, Z., Junge K., Klosterhalfen, B., Schumpelick, V.	A role for the collagen I/III and MMP-1/-13 genes in primary inguinal hernia?	Rosch, R., Klinge, U., Si, Z., Junge K., Klosterhalfen, B., Schumpelick, V. A role for the collagen I/III and MMP-1/-13 genes in primary inguinal hernia? BMC Med Genet. (2002); 3:2

2003	Schachtrupp, A., Klinge, U., Junge, K., Rosch, R., Bhardwaj, RS., Schumpelick, V.	Individual inflammatory response of human blood monocytes to mesh biomaterials	Schachtrupp, A., Klinge, U., Junge, K., Rosch, R., Bhardwaj, RS., Schumpelick, V. Individual inflammatory response of human blood monocytes to mesh biomaterials. British Journal of Surgery (2003); 90:00-00
2013	Klosterhalfen, B., Klinge, U.	Retrieval study at 623 human mesh explants made of polypropylene - impact of mesh class and indication for mesh removal on tissue reaction	Klosterhalfen, B., Klinge, U. Retrieval study at 623 human mesh explants made of polypropylene - impact of mesh class and indication for mesh removal on tissue reaction Wiley Online Library (2013) DOI:10.1002/jbmb.32958
2012	Choi, J et al	Use of Mesh During Ventral Hernia Repair in Clean-Contaminated and Contaminated Case	Choi, J et al. Use of Mesh During Ventral Hernia Repair in Clean-Contaminated and Contaminated Cases. Annals of Surgery (2012) 255:1
2010	Hawn MT, Gray SH, Snyder CW, Graham LA, Finan KR, Vick CC	Predictors of mesh explantation after incisional hernia repair	Hawn MT, Gray SH, Snyder CW, Graham LA, Finan KR, Vick CC. Predictors of mesh explantation after incisional hernia repair Am J Surg. 2011 Jul;202(1):28-33. doi: 10.1016/j.amjsurg.2010.10.011.
2003	Finan KR, Vick CC, Kiefe CI, Neumayer L, Hawn MT	Individual inflammatory response of human blood monocytes to mesh biomaterials	Finan KR, Vick CC, Kiefe CI, Neumayer L, Hawn MT. Individual inflammatory response of human blood monocytes to mesh biomaterials Br J Surg. 2003 Jan;90(1):114-20

2011	Kössler W, Fiebeler A, illms A, ElAidi T, Klosterhalfen B, Klinge U	Formation of translational risk score based on correlation coefficients as an alternative to Cox regression models for predicting outcome in patients with NSCLC	Kössler W, Fiebeler A, illms A, ElAidi T, Klosterhalfen B, Klinge U. Formation of translational risk score based on correlation coefficients as an alternative to Cox regression models for predicting outcome in patients with NSCLC; Theor Biol Med Model. 2011 Jul 27;8:28. doi: 10.1186/1742-4682-8-28.
2009	Klinge U, Fiebeler A.	Analysis of survival curve configuration is relevant for determining pathogenesis and causation	Klinge U, Fiebeler A. Analysis of survival curve configuration is relevant for determining pathogenesis and causation. Med Hypotheses. 2009 May;72(5):510-7. doi: 10.1016/j.mehy.2008.12.035. Epub 2009 Feb 7.
2006	Rosch R, Lynen-Jansen P, Junge K, Knops M, Klosterhalfen B, Klinge U, Mertens PR, Schumpelick V	Hernia fibroblasts lack beta-estradiol-induced alterations of collagen gene expression.	Rosch R, Lynen-Jansen P, Junge K, Knops M, Klosterhalfen B, Klinge U, Mertens PR, Schumpelick V, Hernia fibroblasts lack beta-estradiol-induced alterations of collagen gene expression. BMC Cell Biol. 2006 Sep 29;7:36.



2004	Junge K, Klinge U, Rosch R, Mertens PR, Kirch J, Klosterhalfen B, Lynen P, Schumpelick V. Langenbecks	Decreased collagen type I/III ratio in patients with recurring hernia after implantation of alloplastic prostheses.	Junge K, Klinge U, Rosch R, Mertens PR, Kirch J, Klosterhalfen B, Lynen P, Schumpelick V. Langenbecks. Decreased collagen type I/III ratio in patients with recurring hernia after implantation of alloplastic prostheses. Arch Surg. 2004 Feb;389(1):17-22. Epub 2003 Oct 24.
2006	Lynen Jansen P, Rosch R, Rezvani M, Mertens PR, Junge K, Jansen M, Klinge U	Hernia fibroblasts lack beta-estradiol-induced alterations of collagen gene expression.	Lynen Jansen P, Rosch R, Rezvani M, Mertens PR, Junge K, Jansen M, Klinge U. Hernia fibroblasts lack beta-estradiol-induced alterations of collagen gene expression. BMC Cell Biol. 2006 Sep 29;7:36.
2002	Zheng H, Si Z, Kasperk R, Bhardwaj RS, Schumpelick V, Klinge U, Klosterhalfen B.	Recurrent inguinal hernia: disease of the collagen matrix?	Zheng H, Si Z, Kasperk R, Bhardwaj RS, Schumpelick V, Klinge U, Klosterhalfen B. Recurrent inguinal hernia: disease of the collagen matrix? World J Surg. 2002 Apr;26(4):401-8. Epub 2002 Jan 2.
2002	Si Z, Bhardwaj R, Rosch R, Mertens PR, Klosterhalfen B, Klinge U	Impaired balance of type I and type III procollagen mRNA in cultured fibroblasts of patients with incisional hernia.	Si Z, Bhardwaj R, Rosch R, Mertens PR, Klosterhalfen B, Klinge U. Impaired balance of type I and type III procollagen mRNA in cultured fibroblasts of patients with incisional hernia. Surgery. 2002 Mar;131(3):324-31

2002	Rosch R, Klinge U, Si Z, Junge K, Klosterhalfen B, Schumpelick V.	A role for the collagen I/III and MMP-1/-13 genes in primary inguinal hernia?	Rosch R, Klinge U, Si Z, Junge K, Klosterhalfen B, Schumpelick V. A role for the collagen I/III and MMP-1/-13 genes in primary inguinal hernia? BMC Med Genet. 2002;3:2. Epub 2002 Feb 19.
2011	R. de Tayrac and V. Letouzey	Basic science and clinical aspects of mesh infection in pelvic floor reconstructive surgery	R. de Tayrac and V. Letouzey, "Basic science and clinical aspects of mesh infection in pelvic floor reconstructive surgery.," International urogynecology journal, vol. 22, no. 7, pp. 775-80, Jul. 2011
2012	Sternschuss G, Ostergard DR, Patel H.	Post-implantation alterations of polypropylene in the human	Sternschuss G, Ostergard DR, Patel H., Post-implantation alterations of polypropylene in the human, J Urol, 188 (2012) 27-32.
2011	Laurent Mamy, Vincent Letouzey, Jean-Philippe Lavigne, Xavier Garric, Jean Gondry, Pierre Mares, Renaud de Tayrac	Correlation between shrinkage and infection of implanted synthetic meshes using an animal model of mesh infection	Laurent Mamy, Vincent Letouzey, Jean-Philippe Lavigne, Xavier Garric, Jean Gondry, Pierre Mares, Renaud de Tayrac, Correlation between shrinkage and infection of implanted synthetic meshes using an animal model of mesh infection, Int Urogynecol J, 22 (2011) 47-52.
12/19/2000	Hinsch, et al.	United States Patent 6,162,962	
		TVT - Device Kit	
	Henneman, N., Klinge, U., Maass, N., Kirschner-Hermanns	Comparing Different Types of suburethral slings using perineal ultrasound	Henneman, N., Klinge, U., Maass, N., Kirschner-Hermanns Comparing Different Types of suburethral slings using perineal ultrasound

2013	Wood, Et al.	Materials Characterization and histological analysis of explanted polypropylene, PTFE, and PET hernia meshes from an individual patient.	Wood, et al. Materials Characterization and histological analysis of explanted polypropylene, PTFE, and PET hernia meshes from an individual patient. J Mater Sci: Mater med (2013) 24:1113-1122
2001	Falconer, C., Soderberg, M., Blomgren, B., Ulmsten, U.	Influence of Different Sling Materials on Connective Tissue Metabolism in Stress Urinary Incontinent Women	Falconer, C., Soderberg, M., Blomgren, B., Ulmsten, U. <i>Influence of Different Sling Materials on Connective Tissue Metabolism in Stress Urinary Incontinent Women.</i> Int Urogyn J (2001) (Suppl 2):S19-S23
2013	Gao, Y., Liu, L., Blatnik, J., Krpata, D., Anderson, J., Criss, C., Posielski, N., Novitsky, Y.	Methodology of fibroblast and mesenchymal stem cell coating for surgical meshes: A pilot analysis	Gao, Y., Liu, L., Blatnik, J., Krpata, D., Anderson, J., Criss, C., Posielski, N., Novitsky, Y. <i>Methodology of fibroblast and mesenchymal stem cell coating for surgical meshes: A pilot analysis.</i> Wiley Online Library (2013)
2012	Klinge, U., Klosterhalfen, B.	<i>Modified classification of surgical meshes for hernia repair based on the analysis of 1,000 explanted meshes</i>	Klinge, U., Klosterhalfen, B., Modified Classification of surgical meshes for hernia repair based on the analysis of 1,000 explanted meshes, Hernia DOI 10.1007/s10029-012-0913-6
2010	Brown, CN, Finch, JG	Which mesh for hernia repair?	Brown, C., Finch, J, Which mesh for hernia repair? Ann R Coll Surg Engl 2010; 92: 272-278

2013	Nillson, C., Palva, K., Aarnio, R., Morocos, E., Falconer, C.	Seventeen years' follow-up of the tension-free vaginal tape procedure for female stress urinary incontinence	Nillson, C., Palva, K., Aarnio, R., Morocos, E., Falconer, C., Seventeen years' follow-up of the tension-free vaginal tape procedure for female stress urinary incontinence, Int Urogynecol J. 2013 Aug;24(8):1265-9. doi: 10.1007/s00192-013-2090-2. Epub 2013 Apr 6.
2005	Lin, A., Wang, S., Chen, K., Chang, L	In Vivo Tension Sustained by Fascial Sling in Pubovaginal Sling Surgery for Female Stress Urinary Incontinence	Lin, A., Wang, S., Chen, K., Chang, L, In Vivo Tension Sustained by Fascial Sling in Pubovaginal Sling Surgery for Female Stress Urinary Incontinence, The Journal of Urology, Vol. 173, 894 - 897, March 2005
2013	A. Feola, S. Abramowitch, P. Moalli	Biomechanical Studies of the Pelvic Floor: Utilizing Urogynecological Animal Models	Handout Materials - 2013 IUGA Conference -Ku Leuven
2013	E. Kaldenhoff, U. Klinge, B. Klosterhalfen, L. Najjari, N. Maass	Von der Prolaps- zur Problempatientin Schenken wir der Qualität von Netzümplantaten genügend Aufmerksamkeit?	E. Kaldenhoff, U. Klinge, B. Klosterhalfen, L. Najjari, N. Maass, Von der Prolaps- zur Problempatientin Schenken wir der Qualität von Netzümplantaten genügend Aufmerksamkeit?, vorGynäkologe 2013 DOI 10.1007/s00129-012-3124-4
		All documents that I recently produced to Ethicon	

		All Documents that Prof. Klosterhalfen recently produced to Ethicon	
		All documents to be produced by Dr. Todd Heniford	
2011	Olivier Lefranc, Yves Bayon, Suzelei Montanari, Philippe Gravagna, and Michel Thérin	Reinforcement Materials in Soft Tissue Repair: Key Parameters Controlling Tolerance and Performance – Current and Future Trends in Mesh Development	Olivier Lefranc, Yves Bayon, Suzelei Montanari, Philippe Gravagna, and Michel Thérin, Reinforcement Materials in Soft Tissue Repair: Key Parameters Controlling Tolerance and Performance – Current and Future Trends in Mesh Development, P. von Theobald et al. (eds.), New Techniques in Genital Prolapse Surgery, DOI: 10.1007/978-1-84882-136-1_25, © Springer-Verlag London Limited 2011
		Duren Instature PF Explant Grid and Summary	
		Medical records of Carolyn Lewis: Dr. Boreham, Dr. Zimmern, UT Southwestern University	
1998	Klosterhalfen, K., Klinge, K., Schumpelick, V.	Functional and morphological evaluations of different polypropylene-mesh modifications for abdominal wall report	Klosterhalfen, K., Klinge, K., Schumpelick, V., Functional and morphological evaluations of different polypropylene-mesh modifications for abdominal wall report (1998) Biomaterials 19
	L. Velemir, B Fatton, B. Jacquetin	Powerpoint Titled "Mesh Shrinkage: How to assess, how to prevent, how to manage?"	

	Klinge, U	Powerpoint Titled "Textile for the pelvic floor (flat meshes or slings)"	
12/8/2012	Klosterhalfen, B	PowerPoint Titled "What Can We Learn From Explanted Meshes"	
2013	Sajid MS, Kalra L, Parampalli U, Sains PS, Baig MK	A systematic review and meta-analysis evaluating the effectiveness of lightweight mesh against heavyweight mesh in influencing the incidence of chronic groin pain following laparoscopic inguinal hernia repair	Sajid MS, Kalra L, Parampalli U, Sains PS, Baig MK. A systematic review and meta-analysis evaluating the effectiveness of lightweight mesh against heavyweight mesh in influencing the incidence of chronic groin pain following laparoscopic inguinal hernia repair. Am J Surg (2013) 205(6):726-36
2013	Zhong C, Wu B, Yang Z, Deng X, Kang J, Guo B, Fan	A meta-analysis comparing lightweight meshes with heavyweight meshes in Lichtenstein inguinal hernia repair	Zhong C, Wu B, Yang Z, Deng X, Kang J, Guo B, Fan Y. A meta-analysis comparing lightweight meshes with heavyweight meshes in Lichtenstein inguinal hernia repair Surg Innov. 2013 Feb;20(1):24-31. doi: 10.1177/1553350612463444. Epub 2012 Oct 16. Review
2012	Śmietański M, Śmietańska IA, Modrzejewski A, Simons MP, Aufenacker TJ	Systematic review and meta-analysis on heavy and lightweight polypropylene mesh in Lichtenstein inguinal hernioplasty	Śmietański M, Śmietańska IA, Modrzejewski A, Simons MP, Aufenacker TJ. Systematic review and meta-analysis on heavy and lightweight polypropylene mesh in Lichtenstein inguinal hernioplasty. Hernia. 2012 Oct;16(5):519-28. doi: 10.1007/s10029-012-0930-5. Epub 2012 Jul 24. Review



**EXPERT REPORTS:**

Expert Report of Prof. Dr.- Ing Thomas Muehl
Expert Report of Vladimir Iakovlev, MD, FRCPC, FCAP
Expert Report of Howard Jordi, Ph.D.
Expert Report of Paul Ducheyne, Ph. D.
Expert Report of Dr. Daniel Elliott, MD